

Water Conservation Study (Water and Energy)
Energy Engineering Analysis Program (EEAP) FY94S
Fort Knox, Kentucky

Final Report

Volume 2 of 3

CONTRACT #DACA01-94-D-0034
SYSTEMS CORP PROJECT #94013.03
DECEMBER 30, 1994



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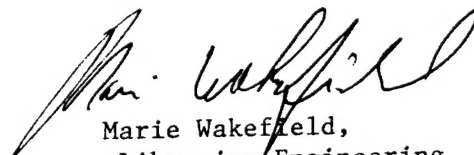

Marie Wakefield,
Librarian Engineering

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6 *ECIP PROJECT 4*

FY94S WATER CONSERVATION STUDY (WATER AND ENERGY), FT. KNOX, KY

This section contains the project description and the DD1391 forms for ECIP Project FH-4, Conservation improvements to 452 Non-Family Housing Buildings. Two lists of the buildings included in the project follow the DD1391 forms. The first list includes all buildings considered in the project in numerical order. The second list shows which buildings were used to model unsurveyed buildings. Following these lists are the LCCID report and the cost estimate for the proposed project. Calculation sheets for the individual buildings follow the project cost estimate. Below is a detailed index of the information included in this section.

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DATE: 22 December 1994
PROJECT NO.: ECIP-4
PROJECT TITLE: Water Conservation Improvements to 452 Buildings
INSTALLATION: Fort Knox
LOCATION: Kentucky

PRIMARY FACILITY

Metering Valves, Flush Valves and Aerators \$1,713,000

ESTIMATED CONTRACT COST	\$1,415,273
CONTINGENCY PERCENT (10%)	141,527
SUBTOTAL	1,556,800
SUPERVISION, INSPECTION & OVERHEAD (5%)	77,840
DESIGN COST	77,840
TOTAL REQUEST	1,712,480
TOTAL REQUEST (ROUNDED)	\$1,713,000

Replace flush valves and faucets in 452 buildings with water saving flush valves, metering valve faucets, and install faucet aerators. The project will significantly reduce potable water consumption and sanitary waste production.

DATE: 22 December 1994
PROJECT NO.: ECIP-4
PROJECT TITLE: Water Conservation Improvements to 452 Buildings
INSTALLATION: Fort Knox
LOCATION: Kentucky

PROJECT:

Replace flush valves at water closets and urinals with water saving flush valves, replace faucets at lavatories with metering valve faucets and install faucet aerators in 452 buildings.

REQUIREMENTS:

Fort Knox utilizes inefficient outdated flush valves and faucets in its buildings. The existing flush valves and faucets consume significantly more water and generate greater quantities of sanitary waste per flush than necessary. The existing inefficient systems place greater demand on the water table, water treatment plant and waste treatment plant. The U.S. Army Corp of Engineers, Louisville District, contracted an Energy Engineering Analysis Program (EEAP) Water Conservation Study of the Post. The study identified energy and water conservation opportunities. Life cycle cost analysis was performed on each opportunity to determine its discounted savings-to -investment ratio (SIR) and estimated payback period. This project has a SIR of 3.68 and a simple payback period of 4.12 years. The project exceeds the minimum requirements of an SIR greater than 1.25 and a simple payback of less than 10 years.

CURRENT SITUATION:

The buildings at Ft. Knox have inefficient flush valves and faucets and lack aerators at many sinks. The buildings consume more water and generate more sanitary waste than is necessary. The new flush valves, faucets and aerators will greatly reduce the water consumption and waste generated.

IMPACT IF NOT PROVIDED:

If this project is not implemented, 452 buildings will continue to consume more water and generate more waste than necessary. The U.S. Army will fail to realize an estimated \$415K in annual savings (FY95\$) and a total discounted savings of \$6.3M during the twenty year life of the project.

ADDITIONAL:

A life cycle cost analysis was performed on the project. The project will realize water savings of over 3.6 times the initial investment cost and will pay for itself in less than 4.2 years.

Ft. Knox is not on the list of installations considered for closure or realignment.

DATE: 22 December 1994
PROJECT NO.: ECIP-4
PROJECT TITLE: Water Conservation Improvements to 452 Buildings
INSTALLATION: Fort Knox
LOCATION: Kentucky

SECTION 11 - ECONOMIC ANALYSIS DATA

11D ECONOMIC JUSTIFICATION SUMMARY

This water conservation project is recommended for funding. A life cycle cost analysis was performed on each portion of this project and on the overall project. The overall project will realize water savings of over 3.6 times the initial investment cost and will pay for itself in less than 4.2 years.

TABLE 6.1 ECIP 4 - NON-FAMILY HOUSING

18	610	2339	4548
70	613	2350	4555
72	850	2351	4769
73	851	2352	5014
79	853	2368	5047
80	855	2369	5217
82	888	2371	5220
94	1002	2381	5223
98	1017	2385	5232
100	1020	2422	5252
101	1054	2425	5253
119	1055	2426	5256
121	1117	2608	5915
158	1118	2723	5916
171	1131	2730	5917
236	1138	2754	5918
261	1173	2755	5919
296	1174	2756	5920
400	1176	2757	5921
469	1308	2762	5922
482	1321	2763	5923
483	1359	2764	5924
484	1391	2765	5925
485	1392	2766	5926
486	1393	2767	5927
501	1394	2770	5928
502	1467	2778	5932
504	1468	2786	5933
509	1474	2787	5934
511	1476	2788	5935
512	1487	2789	5936
514	1531	2806	5937
523	1532	2827	5938
524	1539	2942	5939
526	1541	2943	5940
531	1543	2944	5941
532	1544	2955	5942
534	1547	2958	5950
536	1548	2959	5951
538	1549	2960	6010
539	1595	2961	6011
540	1609	2963	6012
548	1610	2964	6013
549	1720	2969	6014
550	1724	2970	6015
552	1726	2971	6017
557	1730	2972	6018
567	1810	2973	6113
568	1996	2974	6114
569	1997	2979	6115
573	1998	2980	6116
608	2010	4014	6117
609	2020	4250	6118

6142	6625	6744	6888
6143	6628	6747	6889
6144	6629	6748	6892
6145	6631	6751	6894
6146	6637	6758	6897
6147	6652	6761	6901
6291	6655	6803	6902
6293	6656	6804	6906
6294	6659	6807	7007
6335	6660	6808	7011
6401	6662	6811	7012
6402	6663	6812	7014
6536	6664	6814	7015
6537	6665	6815	7016
6539	6670	6816	7017
6541	6671	6817	7019
6542	6672	6820	7020
6543	6673	6821	7021
6544	6675	6822	7022
6546	6676	6823	7024
6547	6679	6825	7025
6548	6680	6826	7028
6550	6683	6829	7029
6551	6687	6830	7031
6552	6690	6833	7035
6555	6691	6837	7036
6556	6694	6839	7038
6557	6695	6840	7038
6558	6698	6843	7041
6560	6699	6844	7043
6561	6700	6847	7044
6562	6702	6848	7049
6563	6705	6851	7050
6564	6706	6852	7054
6568	6708	6855	7055
6571	6709	6856	7057
6573	6713	6859	7058
6574	6714	6860	7067
6576	6715	6861	7068
6577	6718	6863	7070
6580	6721	6865	7071
6581	6722	6866	7074
6587	6725	6867	7075
6590	6726	6870	7077
6592	6728	6871	7078
6597	6729	6873	7079
6602	6730	6874	7080
6605	6731	6875	7082
6607	6733	6876	7083
6611	6736	6879	7084
6616	6738	6880	7085
6617	6739	6881	7087
6620	6740	6882	7088
6623	6741	6884	7091
6624	6743	6885	

TABLE 6.2 BUILDINGS MODELED BY SURVEYED BUILDINGS

BUILDINGS SURVEYED AND CALCULATED	BUILDINGS ASSUMED TYPICAL OF SURVEYED BUILDINGS
18	
70	
72	
73	
79	
80	
82	
94	
98	
100	
101	
119	
121	
158	486, 2730
171	
400	
469	
485	482, 483, 484, 5232
501	
502	
850	
851	
853	
855	
888	6401, 6861
1002	

1017	532, 1020
1054	
1055	
1117	
1118	
1131	
1138	
1173	
1174	
1176	5014, 6402, 6870
1308	
1321	
1359	
1392	1391, 1394
1393	
1467	
1468	
1487	
1531	
1532	1539
1541	1543, 1544, 1549, 6901
1609	
1610	
1720	
1724	
1726	
1730	
1810	
1996	
1997	

1998	557, 7103
2010	
2020	
2339	5932, 5935
2352	
2368	
2369	
2385	
2425	1547, 1548, 2350, 2351
2426	1595
2608	1474
2723	
2764	236, 573, 608, 609, 610, 2762, 2763, 2765, 2766, 2767, 2786, 2787, 2788, 2789, 7238
2770	
2778	
2943	2942
2955	2960, 2961, 2964, 2971, 2972, 2973, 2974, 2979, 2980, 6113, 6115, 6116, 6118, 6576
2958	2944
4014	
4250	
4548	
4555	
4769	
5217	
5220	
5223	
5252	
5253	
5256	

5916	
5917	5915, 5940, 5942, 6012, 6018
5918	6587
5920	5919, 5921, 5922, 5936, 5937, 5938, 5939, 6010, 6011, 6015, 6017
5925	2422, 5924, 5933, 5934, 6013, 6014
5926	5923, 5950, 5951
5927	
5928	
6117	2959, 2963, 2969, 2970, 6114, 6577
6147	6142, 6144, 6145, 6902
6291	9181
6335	
6537	
6539	296, 1476, 2371, 2381, 6731
6541	6548, 6550, 6557
6544	
6546	6542, 6543, 6547, 6551, 6552, 6555, 6556, 6558
6568	
6571	
6574	6573
6581	5941, 6580
6590	
6592	6143, 6146
6597	
6607	
6611	
6616	
6617	
6620	
6629	6605, 6623, 6624, 6625, 6628

6631	
6670	6655, 6656, 6659, 6660, 6662, 6663, 6664, 6665, 6671, 6672, 6673, 6675, 6676, 6679, 6680, 6694, 6694, 6695, 6698, 6699, 6700, 6702, 6705, 6706, 6709, 6718, 6721, 6722, 6725, 6726, 6733, 6736, 6739, 6740, 6743, 6744, 6747, 6748, 6751, 6804, 6807, 6808, 6811, 6812, 6814, 6815, 6816, 6817, 6820, 6821, 6822, 6823, 6825, 6826, 6829, 6830, 6830, 6839, 6840, 6843, 6844, 6847, 6848, 6851, 6852, 6855, 6856, 6859, 6860, 6866, 6867, 6871, 6873, 6874, 6875, 6876, 6879, 6880, 6881, 6882, 6884, 6885, 6888, 6889, 6892, 7007, 7011, 7012, 7014, 7015, 7016, 7017, 7019, 7020, 7021, 7022, 7024, 7025, 7028, 7035, 7036, 7038, 7039, 7043, 7044, 7049, 7050, 7054, 7055, 7057, 7058, 7067, 7068, 7070, 7071, 7074, 7075, 7077, 7078, 7079, 7080, 7082, 7083, 7084, 7085, 7087, 7088, 7091, 7092, 7094, 7095, 7998
6758	
6837	
6863	
6894	
6897	2755, 2757, 6561, 6564
7029	
7031	6803
7041	6536, 6708, 6865
7104	6293, 6294, 6687, 6715
7392	
7393	261, 504, 509, 511, 512, 514, 523, 524, 526, 531, 534, 536, 538, 539, 540, 548, 549, 550, 552, 567, 568, 569, 6602, 6637, 6652, 6683, 6690, 6691, 6713, 6714, 6728, 6729, 6730, 6738, 6741
7425	613, 2754, 2756, 2806, 2827, 6560, 6562, 6563, 6906
7738	
7741	
7955	
7956	
7959	
9261	
9306	
9308	
9309	

LIFE CYCLE COST ANALYSIS SUMMARY

ENERGY CONSERVATION INVESTMENT PROGRAM (ECIP) STUDY: ECIP-4
 INSTALLATION & LOCATION: FT KNOX REGION NOS. 4 LCCID FY95 (92)
 PROJECT NO. & TITLE: ECIP-4 NON-FAMILY HOUSING PROJECT CENSUS: 3
 FISCAL YEAR 1995 DISCRETE PORTION NAME: WATER
 ANALYSIS DATE: 12-30-94 ECONOMIC LIFE 20 YEARS PREPARED BY: DERRINGTON

1. INVESTMENT

A. CONSTRUCTION COST	\$	1556800.	
B. SIOH	\$	77840.	
C. DESIGN COST	\$	77840.	
D. TOTAL COST (1A+1B+1C)	\$	1712480.	
E. SALVAGE VALUE OF EXISTING EQUIPMENT	\$	0.	
F. PUBLIC UTILITY COMPANY REBATE	\$	0.	
G. TOTAL INVESTMENT (1D - 1E - 1F)			\$ 1712480.

2. ENERGY SAVINGS (+) / COST (-)

DATE OF NISTIR 85-3273-X USED FOR DISCOUNT FACTORS OCT 1994

FUEL	UNIT COST \$/ MWH (1)	SAVINGS MWH/YR (2)	ANNUAL \$ SAVINGS (3)	DISCOUNT FACTOR (4)	DISCOUNTED SAVINGS (5)
A. ELECT	\$ 46.40	0.	\$ 0.	15.08	\$ 0.
B. DIST	\$.00	0.	\$ 0.	18.57	\$ 0.
C. RESID	\$.00	0.	\$ 0.	21.02	\$ 0.
D. NAT G	\$ 10.51	3150.	\$ 33107.	18.58	\$ 615119.
E. COAL	\$.00	0.	\$ 0.	16.83	\$ 0.
F. PPG	\$.00	0.	\$ 0.	17.38	\$ 0.
M. DEMAND SAVINGS			\$ 0.	14.88	\$ 0.
N. TOTAL		3150.	\$ 33107.		\$ 615119.

3. NON ENERGY SAVINGS (+) / COST (-)

A. ANNUAL RECURRING (+/-)

(1) DISCOUNT FACTOR (TABLE A)	14.88	\$ 296600.
(2) DISCOUNTED SAVING/COST (3A X 3A1)		\$ 4413408.

B. NON RECURRING SAVINGS (+) / COSTS (-)

ITEM	SAVINGS (+) COST (-)	YR OC	DISCNT FACTOR	DISCOUNTED SAVINGS (+) / COST (-) (4)
1. REPLACEMENT	\$1712480.	10	.74	1267235.
d. TOTAL	\$1712480.			1267235.

C. TOTAL NON ENERGY DISCOUNTED SAVINGS (+) / COST (-) (3A2+3Bd4) \$ 5680643.

4. FIRST YEAR DOLLAR SAVINGS $2N3+3A+(3Bd1/(YRS \text{ ECONOMIC LIFE}))$ \$ 415331.

5. SIMPLE PAYBACK PERIOD (1G/4) 4.12 YEARS

6. TOTAL NET DISCOUNTED SAVINGS (2N5+3C) \$ 6295762.

7. SAVINGS TO INVESTMENT RATIO (SIR) = (6 / 1G) = 3.68
 (IF < 1 PROJECT DOES NOT QUALIFY)

**** Project does not qualify for ECIP funding; 4,5,6 for information only.

8. ADJUSTED INTERNAL RATE OF RETURN (AIRR): N/A

- Water-saving 1.5 gallon flush.
- Features Pressure-Clean™ flushometer tank system.
- Three-bolt quick connect system with factory-installed tank gasket and bolts.

K-3458 Wellworth Lite PC Toilet, vitreous china, 1.5 gallon flush. Close-coupled design with elongated bowl. Minimum roughing-in is 12" (305 mm).

Tank/bowl combination includes K-4333 bowl, K-4470 vitreous china tank with Kohler 81100 flushometer tank system, K-4471 tank cover and K-9434 chrome-plated trip lever.

IMPORTANT—For most satisfactory operation, a minimum static water pressure of 25 P.S.I. is required at the toilet supply inlet.

Recommended Seats and Supply

K-4650 Lustra™ solid plastic seat with open front and cover.

K-4652 Lustra solid plastic seat with closed front and cover.

K-4670-C Lustra solid plastic seat (K-4681-C Black Black™) with open front and check hinge.

K-7637 ¾" angle supply with stop.

Tank Locks—Add suffix "-T" to product number.

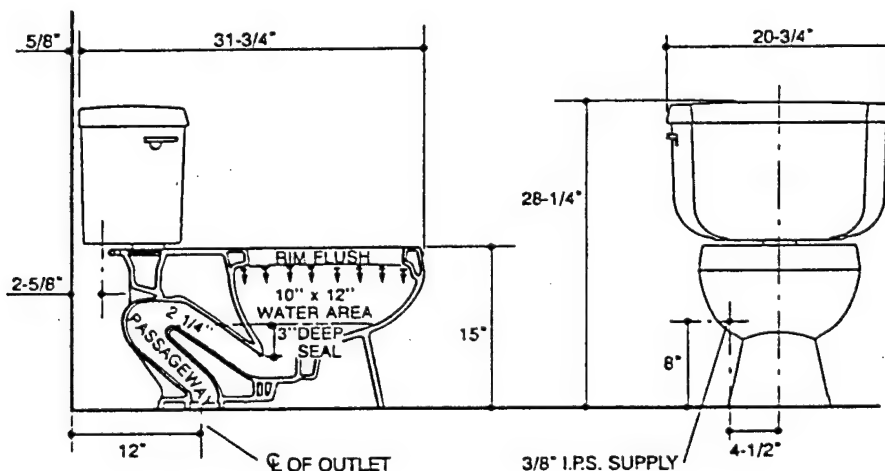
Bedpan Lugs—Add suffix "-L" to product number.

For complete color selection, see Colors section.



U.S. Pat. Pending

Wellworth Lite PC Toilet and Lustra seat (K-4652) in White.



KOHLER

SLOAN

FLUSHOMETERS

COVERS & INSIDE PARTS

USE FOR 1 1/4" TAILSPUD ON URINAL

- A-19-AC CLOSET Relief Valve
- A-19-AU URINAL Relief Valve
- A-15-A Disc
- A-156-A Diaphragm w/A-29
- A-163-A Guide Assembly

- A-72 Chrome Plated Cover
- A-71 Inside Cover

- A-36-A Inside Parts Kit for closets, service sinks, blowout and syphon jet urinals
- A-37-A Inside Parts Kit for washdown urinals
- A-38-A Retro Water Saver Kit - saves one gallon per flush for syphon jet closets

HANDLE PARTS & ASSEMBLIES*

- A-6 Chrome Plated handle Coupling
- B-7-A Chrome Plated Socket
- B-32 Chrome Plated Grip

- B-8-A Plunger
- C-7 Spring
- B-40 Bushing
- A-31 Handle Gasket
- B-39 Seal

- B-50-A Handle Repair Kit

- B-32-A Chrome Plated Handle Assembly also available as
- C-42-A 3" Chrome Plated Push Button Assembly

- A-156-AA Closet/Urinal washer set (includes b-39 Seal, A-156-A Diaphragm, A-15-A Disc and A-31 Gasket)

VACUUM BREAKER PARTS & ASSEMBLIES*

- V-500-A & V-500-AA Chrome Plated Vacuum Breaker Assm. & Vacuum Breaker Repair Kit

- F-5-A 1 1/2" Chrome Plated Spud Coupling Assembly. Also available for 3/4", 1" and 1 1/4" spud couplings

TAILPIECES*

ADJUSTABLE TAILPIECE

- H-551-A 2 1/16" Chrome Plated Adjustable Tailpiece Assembly
- H-550 Chrome Plated Coupling
- H-553 "O" Ring
- H-552 Lock Ring

GROUND JOINT TAILPIECE (not shown)

- H-5 1 3/4" Chrome Plated Ground Joint Coupling
- H-6 Chrome Plated Coupling



H-574 Stop Bumper w/Cap (YO)



H-576 Stop Bumper w/extended Cap (YG)

*For additional information on Sloan Flushometers, parts, kits and assemblies, please refer to the Repair Parts and Maintenance Guide.

CONTROL STOPS*

SCREWDRIVER STOPS

- H-573 1" Chrome Plated Stop Cap
- H-582 3/4" Chrome Plated Stop Cap
- H-579 1" Bonnet
- H-577 3/4" Bonnet
- H-600-A 1" or 3/4" Chrome Plated Screwdriver BAK-CHEK Control Stop
- H-600-AG 1" or 3/4" Chrome Plated Screwdriver BAK-CHEK Control Stop
- H-650-AG 1" Chrome Plated Screwdriver BAK-CHEK Control Stop

- H-541-A Repair Kit for 1" Screwdriver BAK-CHEK Control Stop
- H-543-A Repair Kit for 3/4" Screwdriver BAK-CHEK Control Stop

WHEEL HANDLE STOPS (not shown)

- H-36 Chrome Plated Screw w/H-52 Washer
- H-575 Chrome Plated Wheel Handle
- H-556 Sound Absorbent Washer

- 3308060 Wheel Handle Repair Kit

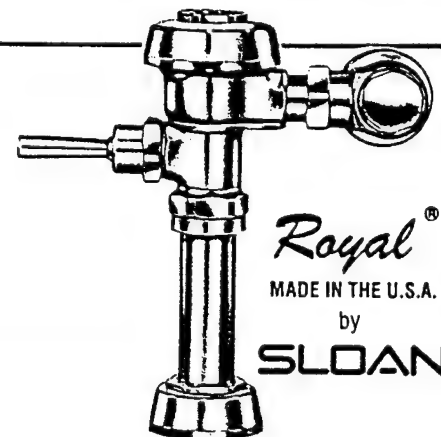
- H-563 1" Bonnet
- H-561 3/4" Bonnet
- H-600-A 1" or 3/4" Chrome Plated Wheel Handle BAK-CHEK Control Stop
- H-650-AG 1" Chrome Plated Wheel Handle BAK-CHEK Control Stop

- H-541-A Repair Kit for 1" Wheel Handle BAK-CHEK Control Stop
- H-543-A Repair Kit for 3/4" Wheel Handle BAK-CHEK Control Stop



A Protective Coating that Effectively Controls Bacteria, Mold & Fungus!

ANTI-MICROBIAL
ADDITIVE REGISTERED
WITH THE E. P. A.



Royal
MADE IN THE U.S.A.
by
SLOAN.

ORDERING INSTRUCTIONS

To place an order, for your convenience and assistance, contact your local Sales Representative. A list of area representatives are on the back of this price sheet.

Exposed Flushometers with YB Variations (Sweat Solder Adaptor)

When ordering Flushometers with the YB Variation you may obtain the kit in two ways:

1) packed with the Flushometer-

For Example:

ROYAL 110-3 YB

Order Code Number: 3010194

2) packed separate-

For Example:

ROYAL 110-3 and Sweat Solder Adaptor

Order Code Numbers: 3010193 & 3308780

Hydraulic Flushometers

When ordering Hydraulic Flushometers the Actuator must be specified and ordered separately.

For Example:

ROYAL 910 YB

Order Code Number: 3910180

HY-33-A FW Actuator

Order Code Number: 0318001

Concealed Flushometers

When ordering Concealed Flushometers please specify the "L" Dimension and/or the Wall Thickness.

Also, please note if it is a Standard Concealed Installation or if it is to be used with a Wall Box Installation. If it is to be used with a Wall Box Installation, the Wall Box *must* be ordered separately:

*On the Flushometer use the description only. DO NOT use the Code Number.

For Example:

*ROYAL 152 8" WALL THICKNESS FOR WALL BOX INSTALLATION

WALL BOX ASSEMBLY

Order Code Number: 0334030

Sloan Flushometers can be furnished to provide the following flush volumes to meet the requirements of all plumbing fixtures (new and existing) and code jurisdictions:

⊗ { MUST HAVE "LOW CONSUMPTION" FIXTURE
TO WORK PROPERLY — NOT ENOUGH WATER
FOR CONVENTIONAL FIXTURE. }

Closet Flushometers

- | | | |
|---|-----------------------------|----------|
| a) Standard | 4.5 GPF (Gallons per Flush) | A-36-A |
| b) Water Saver (specify by using "-3" suffix) | 3.5 GPF | A-38-A |
| c) Low Consumption (specify by using "-1.5" suffix) | 1.6 GPF | A-41-A ⊗ |

Urinal Flushometers (for ¾" spud Urinals)

- | | | |
|---|---------|----------|
| a) Standard | 1.5 GPF | A-37-A |
| b) Low Consumption (specify by using "-1" suffix) | 1 GPF | A-42-A ⊗ |

Urinal Flushometers (for 1¼" spud Urinals)

- | | | |
|---|---------|----------|
| a) Standard | 3 GPF | A-35-A |
| b) Water Saver (specify by using "-1.5" suffix) | 1.5 GPF | A-37-A |
| c) Low Consumption (specify by using "-1" suffix) | 1 GPF | A-42-A ⊗ |

Sloan Flushometers are designed, manufactured and tested to the requirements of ASSE 1037 and ASME/ANSI A112.19.6M

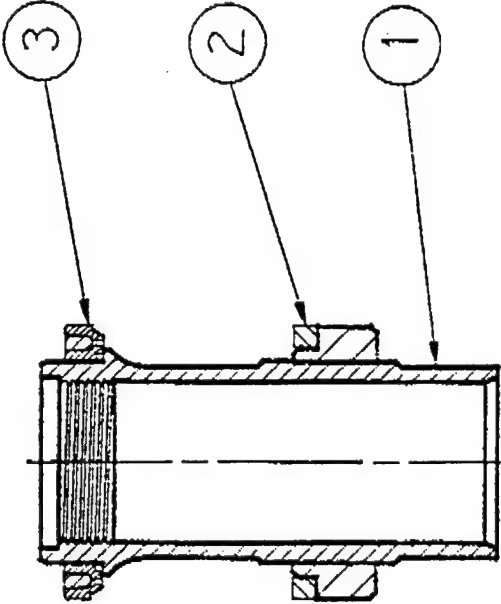
Allowances for Parts Omitted

Each Flushometer listed in this price sheet has its own corresponding code number. When any part is omitted in your selection the code number will change, therefore, order using the full description less any references to code number.

Note: For other parts omitted allow ⅓ of net price of part.

ITEM	ALLOW
F-101 Outlet	.25
F-20 Spud Nut	.25
F-7 Spud Flange	.15
F-7 Wall Flange	.15
Control Stops	2.20
Vacuum Breakers	2.15

ITEM No.	No.	DRWG No.	DESCRIPTION	QTY.
1	A-163	A18989	GUIDE	1
2	A-164	A18990	FLOW RING	1
3	A-170	B23957	REFILL HEAD	1



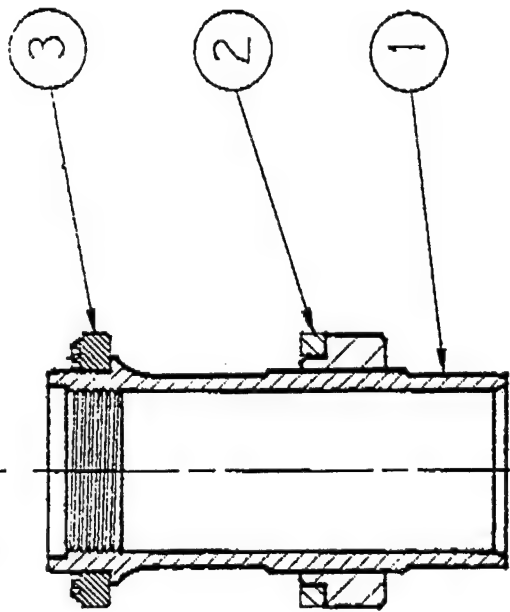
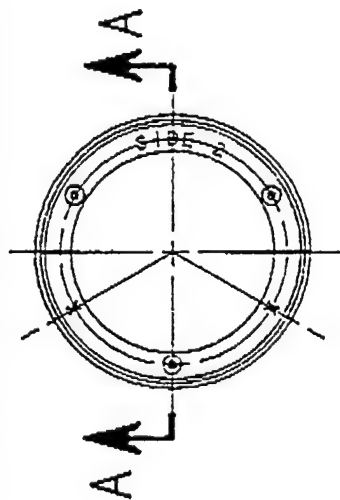
NOTE:
REVERSE A-170 WHEN FURNISHED
FOR 3 GAL. URINAL.

A 19277		A 19277	
163-A		163-A	
CHANGES		CHANGES	
ECN 512		ECN 512	
11-01-67 AM		11-01-67 AM	
① ECN 718		① ECN 718	
06-09-70 CF		06-09-70 CF	
② ECN4097		② ECN4097	
12-16-91 MH		12-16-91 MH	
CADD		CADD	
DATE		DATE	
12-16-91		12-16-91	
DR. MH		DR. MH	
SCALE: 1 : 1		SCALE: 1 : 1	
A		A	
A 19227		A 19227	
163-A		163-A	
DATE		DATE	
10-31-67		10-31-67	

UNLESS OTHERWISE SPECIFIED		USED ON	
FRACTIONAL = $\pm 1/64$ "		A-167-A	
DECIMAL .XX = $\pm .010$ "		A-168-A	
DECIMAL .XXX = $\pm .005$ "		A-169-A	
ANGULAR = $\pm 2^\circ$			
CONCENTRIC = .010TIR			

ROYAL GUIDE ASSEMBLY	
DR. ABN	TR.
CHK'D.	APPR. RB
SLOAN VALVE CO.	
FRANKLIN PARK, IL.	

ITEM No.	PART No.	DRWG No.	DESCRIPTION	QTY.
1	A-163	A 18989	GUIDE	1
2	A-164	A 18990	FLOW RING	1
3	A-170-1	B26789	REFILL HEAD	1



SECTION "A-A"

JAS 1 5 1996

CADD

DATE

12-16-91

DR. MH

SCALE: 1 : 1

A

A 36226

152-A

DATE

12-16-91

USED ON

WATER SAVER
GUIDE

DR. MH

TR.

CHKD. MRS

APPR. CSA

SLOAN VALVE CO.

FRANKLIN PARK, IL.

UNLESS OTHERWISE
SPECIFIEDFRACTIONAL = $\pm 1/64"$ DECIMAL .XX = $\pm .010"$ DECIMAL .XXX = $\pm .005"$ ANGULAR = $\pm 2^\circ$ CONCENTRIC = $\pm .010$ TIR

ITEM No.	PART No.	DRWG No.	DESCRIPTION	QTY.
1	A-163	A 18989	GUIDE	1
2	A-164	A 18990	FLOW RING	1
3	A-179	A 32531	REFILL HEAD	1

JAN 10 1992

A 36225		CADD	
151-A		DATE 12-16-91	
CHANGES		DR. MH	
NPRO 164		SCALE: 1:1	
12-13-91 MH		A	
		A 36225	
		151-A	
		DATE 12-16-91	

USED ON		LOW CONSUMPTION GUIDE	
DR. MH	TR.		
CHKD. MRS	APPR. CSA		
SLOAN VALVE CO.			
FRANKLIN PARK, IL.			

UNLESS OTHERWISE SPECIFIED	
FRACTIONAL = $\pm 1/64"$	
DECIMAL .XX = $\pm .010"$	
DECIMAL .XXX = $\pm .005"$	
ANGULAR = $\pm 2^\circ$	
CONCENTRIC = $\pm .010$ IR	

ITEM No.	PART No.	DRWG No.	DESCRIPTION	QTY.
1	A-163	A 18989	GUIDE	1
2	A-170	B23957	REFILL HEAD	1

①

NPRO 164
12-13-91 MH

A
A 36227
153-A
CHANGES

CADD
DATE
12-18-91
DR. MH

SCALE: 1 : 1
A
A 36227
153-A
DATE
12-18-91

UNLESS OTHERWISE SPECIFIED

FRACTIONAL = $\pm 1/64"$

DECIMAL .XX = $\pm 0.10"$

DECIMAL .XXX = $\pm .005"$

ANGULAR = $\pm 2^\circ$

CONCENTRIC = $\pm .010$ IR

USED ON

LONG FLUSH

DR. MH TR.
CHK'D. MRS APPR. CSA

SLOAN VALVE CO.
FRANKLIN PARK, N.J.

Mixing Valves to Supply Tempered (110°F) Water to Metering and Conventional Single Lever Faucets.

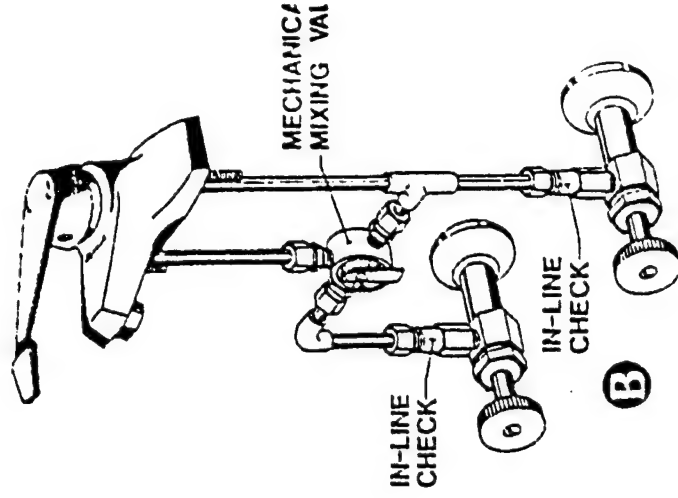
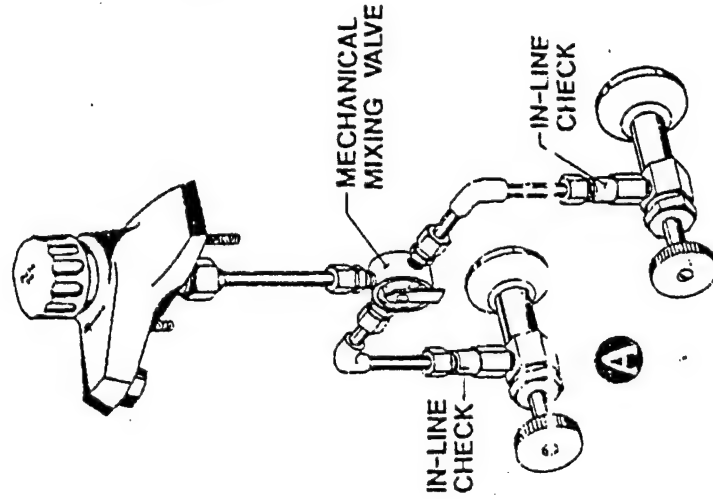
Mechanical Mixing Valve for tempered water supply to an individual faucet. Adjustable temperature. Chrome finish.

#4-10

Mechanical Mixing Valve with $\frac{3}{8}$ compression connections and in-line checks (no piping supplied).

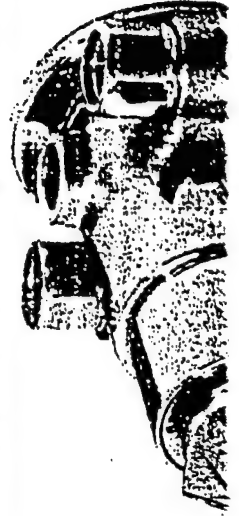
A Metering Faucet illustrated with Mechanical Mixing Valve and Checks installed in hot and cold supplies feeding tempered water to faucet.

B Conventional Single Lever Faucet illustrated with Mechanical Mixing Valve and Checks installed in hot and cold supplies feeding tempered water to hot inlet of faucet.



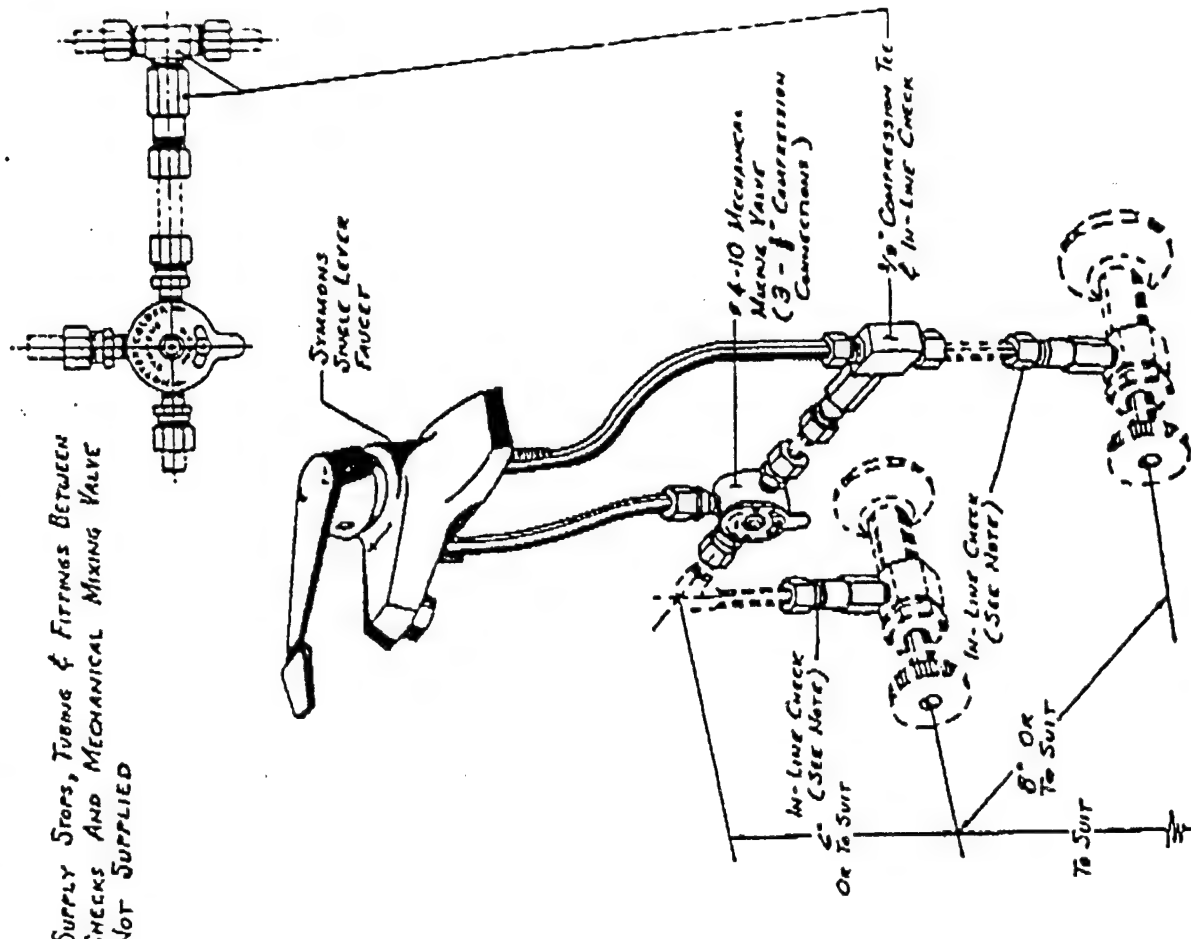
\$34.00

Pressure Balancing Mixing Valve for tempered water supply to a group of faucets. Flow rate 8 GPM @ 45 p.s.i. will supply up to 16 faucets @ 0.5 GPM flow rate. Adjustable temperature. Chrome finish.



*4-10B Mechanical Mixing Valve with 3/8" compression connections, 3 in-line checks and 3/8" compression tee.

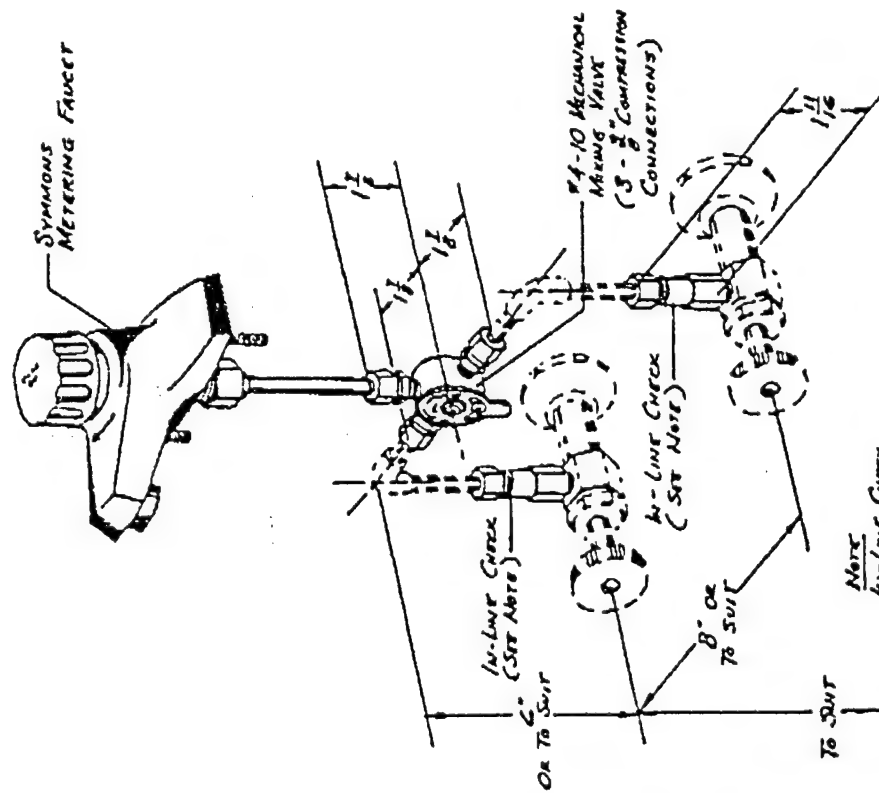
SUPPLY STOPS, TURNING & FITTINGS BETWEEN CHECKS AND MECHANICAL MIXING VALVE NOT SUPPLIED



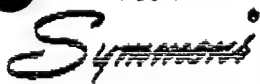
NOTE
In-Line Check
Tip Connection 3/8" Compression,
Bottom Connection 1/2"-24 Threaded
With Gasket (Remove Nut And Flange
From 3/8" Compression Outlet Stop
And Turned On To Stop

*4-10A Mechanical Mixing Valve with 3/8" compression connections and 2 in-line checks.

SUPPLY STOPS, TURNING & FITTINGS BETWEEN CHECKS AND MECHANICAL MIXING VALVE NOT SUPPLIED



NOTE
In-Line Check
Tip Connection 3/8" Compression,
Bottom Connection 1/2"-24 Threaded
With Gasket (Remove Nut And Flange
From 3/8" Compression Outlet Stop
And Turned On To Stop



Industries Inc.,

31 Brooks Drive, Braintree, Mass. 02194

SUBJECT ILLUSTRATED USE OF THE
4-10A & 4-10B MECHANICAL
MIXING VALVE NO. 100386-C

The metering faucet with temperature selection



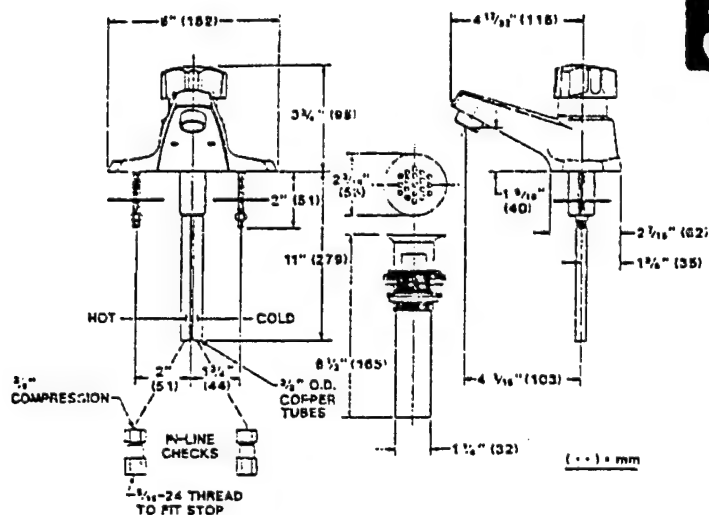
Standard Handle



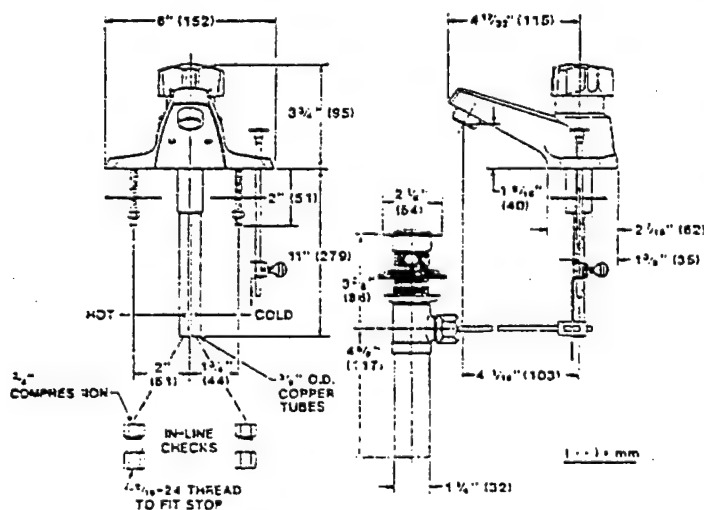
Suffix H
Blade Handle



**Suffix LCT
Acrylic Knob**



S-60-G



S-60-P



- ☐ **S-60-G** Symmons SCOT[®] Metering/Temperature Selection Faucet.
4" Centerset Slow-Closing lavatory faucet to meter and mix hot and cold water supply. Temperature limit stop to adjust outlet temperature. Time limit stop to adjust flow time. Rose spray outlet with 0.5 GPM flow rate. Vandal proof. Grid strainer drain assembly.
- ☐ **S-60-P** With pop-up drain assembly.
- ☐ **S-60-1** With lift rod only.
- ☐ **S-60** Faucet only.

Modifications:

- ☐ Suffix A: Standard aerator in place of rose spray (with standard aerator flow rate is 1.25 GPM at 50 psi).
- ☐ Suffix LCT: Acrylic multi-faceted knob.
- ☐ Suffix QC: For quick-closing feature.
- ☐ Suffix IPS: With 1/2" IPS connections.
- ☐ Suffix STE: Supply tube extensions, 8" w/compression couplings.
- ☐ Suffix H: Blade type handle for Barrier-Free application.



Job.....

SYMMONDS INDUSTRIES INC.

31 BROOKS DRIVE, BRAINTREE, MASSACHUSETTS 02184

TOTAL P.05

```

=====
Estimate:      ECO-1, 2, 3, 4, & Date:      22-Dec-94
Description:   UPGRADE FAUCETS, WATER CLOSETS, & URINALS
Project:      LIMITED EEAP (WTR) Bid Date:
Location:     FORT KNOX, KY      Job #:      94013.03
Sq. footage:  MULTI   BLDGS      City indx: Louisville, KY
=====

```

Line #	Description	Manhours	Matl	Labor	Equipment	Sub	Total
1511410972	ECO - 3 INSTALL 3.5 GAL FLUSH VALVE REPAIR KIT , INCL DEMO, IN WATER CLOSETS					2965.00 Ea.	
Unit values	1.24	15.00	35.04	0.00	0.00		50.04
Totals	3676.60	\$44,475	\$103,905	\$0	\$0		\$148,380
1511410972	ECO - 4 INSTALL 1.0 GAL FLUSH VALVE REPAIR KIT , INCL DEMO, IN URINALS					1635.00 Ea.	
Unit values	1.24	18.00	35.04	0.00	0.00		53.04
Totals	2027.40	\$29,430	\$57,297	\$0	\$0		\$86,727
1511412810	ECO - 2 INSTALL AERATOR, LAVATORY FAUCET					202.00 Ea.	
Unit values	0.25	1.00	7.08	0.00	0.00		8.08
Totals	50.50	\$202	\$1,429	\$0	\$0		\$1,631
1511412810	ECO - 1 INSTALL SPRING LOADED LAVATORY FAUCET AND MIXING VALVE INCL DEMO OF EXISTING					3358.00 Ea.	
Unit values	2.50	139.00	65.00	0.00	0.00		204.00
Totals	8395.00	\$466,762	\$218,274	\$0	\$0		\$685,036
1511412810	ECO - 6 INSTALL AERATOR, EQUIPMENT RELATED FAUCET					34.00 Ea.	
Unit values	0.25	1.00	7.08	0.00	0.00		8.08
Totals	8.50	\$34	\$241	\$0	\$0		\$275
1521801100	ECO - 3 INSTALL NEW WATER SAVING WATER CLOSET, TANK TYPE, FLR MNTD, 2PC WHITE W/ SEAT, 1.6 GPF					70.00 Ea.	
Unit values	4.02	235.00	114.30	0.00	0.00		349.30
Totals	281.40	\$16,450	\$8,001	\$0	\$0		\$24,451
1531607360	VORTEX SHEDDING INSERTION FLOW METER SIXTEEN INCH (16")					4.00 Ea.	
Unit values	32.00	3000.00	677.51	0.00	0.00		3677.51
Totals	128.00	\$12,000	\$2,710	\$0	\$0		\$14,710
1531607380	VORTEX SHEDDING INSERTION FLOW METER TWENTY INCH (20")					6.00 Ea.	
Unit values	48.00	4000.00	1009.26	0.00	0.00		5009.26
Totals	288.00	\$24,000	\$6,056	\$0	\$0		\$30,056
1531607400	VORTEX SHEDDING INSERTION FLOW METER TWENTY-FOUR INCH (24")					8.00 Ea.	

Unit values	64.00	4500.00	1361.70	0.00	0.00	5861.70
Totals	512.00	\$36,000	\$10,894	\$0	\$0	\$46,894

1574223300 WATER FLOW TOTALIZER

Unit values	16.00	2200.00	480.00	0.00	18.00 EA	2680.00
Totals	288.00	\$39,600	\$8,640	\$0	\$0	\$48,240

1574223400 FIELD INTERFACE DEVICES

Unit values	32.00	3800.00	960.00	0.00	2.00 EA	4760.00
Totals	64.00	\$7,600	\$1,920	\$0	\$0	\$9,520

1574223500 CPU PENTIUM 500 MB HD 16MB RAM

Unit values	8.00	4000.00	240.00	0.00	2.00 EA	4240.00
Totals	16.00	\$8,000	\$480	\$0	\$0	\$8,480

```

=====
Line #      Description
-----
              Manhours   Matl      Labor   Equipment   Sub      Total
=====
U15 MECHANICAL  15736   $684,553   $419,847           $0           $0 $1,104,400

1602051770      RIGID GALV STL, CONDUIT TO 15'H, 3/4", W/2
                TERM, 2 ELB, 11 CLAMP/100'
Unit values      0.10      1.48      2.38      0.00      0.00      3.86
Totals           400.00    $5,921    $9,526      $0           $0    $15,447

1611552200      WIRE TELEPHONE TWIST PVC #22-2 C
                (qty) C.L.F.
Unit values      0.80     10.65     19.05     0.00     0.00     29.70
Totals           0.00      $0        $0        $0        $0      $0

1623107200      LO VOLT CONTROL WIRE 2 CONDUCTOR
                40.00 C.L.F.
Unit values      1.27     11.46     30.31     0.00     0.00     41.77
Totals           50.80    $458     $1,212      $0        $0    $1,670

U16 ELECTRICAL  451     $6,379    $10,738           $0           $0    $17,117

```

```
=====
Line #      Description
-----
      Manhours   Matl     Labor   Equipment   Sub      Total
=====
```

ESTIMATE TOTAL	16187	\$690,932	\$430,585	\$0	\$0	\$1,121,517
SALES TAX	0.00%	\$0				
MATL MARKUP	0.00%	\$0				
LABOR MARKUP	22.00%		\$94,729			
EQUIPT MARKUP	0.00%			\$0		
SUB MARKUP	5.00%				\$0	
TOTAL BEFORE CONTINGENC		\$690,932	\$525,314	\$0	\$0	\$1,216,246
CONTINGENCY	15.00%					\$182,437
BOND	3.00%					\$36,487
PROFIT	10.00%					\$121,625
JOB TOTAL						\$1,556,794

```

=====
Estimate:      ECO-1, 2, 3, 4, & Date:      22-Dec-94
Description:   UPGRADE FAUCETS, WATER CLOSETS, & URINALS
Project:      LIMITED EEAP (WTR) Bid Date:
Location:     FORT KNOX, KY      Job #:      94013.03
Sq. footage:  MULTI   BLDGS      City indx: Louisville, KY
=====

```

SUMMARY

```

-----
Manhours  Matl  Labor  Equipment  Sub  Total
=====
U15 MECHANICAL  15736  $684,553  $419,847  $0  $0  $1,104,400
U16 ELECTRICAL   451    $6,379   $10,738  $0  $0   $17,117
TOTAL          16187  $690,932  $430,585  $0  $0  $1,121,517

SALES TAX        0.00%      $0
MATL MARKUP      0.00%      $0
LABOR MARKUP     22.00%     $94,729
EQUIPT MARKUP    0.00%      $0
SUB MARKUP       5.00%      $0

TOTAL BEFORE CONTINGENC  $690,932  $525,314  $0  $0  $1,216,246
CONTINGENCY       15.00%      $182,437
BOND              3.00%      $36,487
PROFIT           10.00%     $121,625
JOB TOTAL                                $1,556,794

```


FY94S EEAP FT. KNOX WATER CONSERVATION STUDY										1	2
CALCULATION WORK SHEET 1										DATE:	31 Oct 94
FACILITY NO.:		18		FUNCTION:		Laundry					
Occupancy:		Operating Hours:									
ECO Number ECO Type	Existing Fixture System		Retrofited Fixture System		Usage HRS/YR	Fixtures Quantity	Water Leaks Eliminated LPY				
	Description	LPM	Description	LPM							
1	Lavatory Sinks	Public Lavatory	9.5	Spring Loaded Faucets	4.7	130	25				
ECO1 TOTAL:			LPM		LPM		25	0			
2	Misc. Sinks	Service Sink	15	Install Aerators	9.5	1095	2				
ECO2 TOTAL:			LPM		LPM						
3	Water Closets	Floor Mounted Flush Valve	17	Install 3.5 GPF Flush Valve	13.2	1300	21				
ECO3 TOTAL:			LPM		LPM		21	0			
4	Urinals	Wall Mounted Flush Valve	5.68	Install 1.0 GPF Flush Valve	3.79	1300	2				
ECO4 TOTAL:			LPM		LPM		2	0			
5	Shower Heads										
ECO5 TOTAL:			LPM		LPM		0	0			
6	Equipment Related										
ECO6 TOTAL:							0	0			

CALCULATION WORK SHEET 2

FACILITY NO.: 18 Water Rate: 0.42 \$/KL Energy Rate: \$/KWH

Gas Rate: 10.51 \$/MWH Demand Rate: \$/KW

ECO Number	ECO Type	Annual Water		Annual Energy Saving			WATER		Total	
		Saving	LPY	ELEC KW	ELEC KWH	GAS MWH	Dollar Saving	Dollar Saving	Dollar Saving	Dollars Invested
1	Lavatory Sinks	1,165,125				3	\$483.53	\$511.52	\$6,120.00	
		0				0	\$0.00	\$0.00	\$0.00	
ECO1 TOTAL:		1,165,125		0	0	3	\$483.53	\$511.52	\$6,120.00	
2	Misc. Sinks	722,700				2	\$3.00	\$20.36	\$19.39	
ECO2 TOTAL:		722,700		0	0	2	\$3.00	\$20.36	\$19.39	
3	Water Closets	103,740					\$43.05	\$43.05	\$1,261.01	
ECO3 TOTAL:		103,740					\$43.05	\$43.05	\$1,261.01	
4	Urinals	4,914					\$2.04	\$2.04	\$127.30	
ECO4 TOTAL:		4,914					\$2.04	\$2.04	\$127.30	
5	Shower Heads	0				0	\$0.00	\$0.00	\$0.00	
ECO5 TOTAL:		0		0	0	0	\$0.00	\$0.00	\$0.00	
6	Equipment Related									
ECO6 TOTAL:		0		0	0	0	\$0.00	\$0.00	\$0.00	

SYSTEMS CORP

Systems Engineering and Management Corporation, Knoxville, TN

FY94S EEAP FT. KNOX WATER CONSERVATION STUDY										PAGE 2	
CALCULATION WORK SHEET 1										DATE: 29 Oct 94	
FACILITY NO.:		70		FUNCTION:		Maintenance					
Occupancy:		10		Operating Hours:		8					
ECO Number	ECO Type	Existing Fixture System		Retrofited Fixture System		Usage	Fixtures	Water Leaks			
		Description	LPM	Description	LPM	HRS/YR	Quantity	Eliminated	LPY		
1	Lavatory Sinks	Public Lavatory	15	Spring Loaded Faucets	4.7	730	2				
ECO1 TOTAL:			LPM		LPM		2		0		
2	Misc. Sinks	Service Sink	15	Install Aerators	9.5	730	1		0		
ECO2 TOTAL:			LPM		LPM						
3	Water Closets	Floor Mounted Flush Valve	17	Install 3.5 GPF Flush Valve	13.2	4000	2				
ECO3 TOTAL:			LPM		LPM		2		0		
4	Urinals	Wall Mounted Flush Valve	5.68	Install 1.0 GPF Flush Valve	3.79	18250	1				
ECO4 TOTAL:			LPM		LPM		1		0		
5	Shower Heads										
ECO5 TOTAL:			LPM		LPM		0		0		
6	Equipment Related										
ECO6 TOTAL:							0		0		

SYSTEMS CORP

Systems Engineering and Management Corporation, Knoxville, TN

CALCULATION WORK SHEET 2

FACILITY NO.: 70 Water Rate: 0.42 \$/KL Energy Rate: \$/KWH

Gas Rate: 10.51 \$/MWH Demand Rate: \$/KW

ECO Number	ECO Type	Annual Water		Annual Energy Saving			WATER		Total	
		Saving	LPY	ELEC KW	ELEC KWH	GAS MWH	Dollar Saving	Dollar Saving	Dollar Saving	Dollars Invested
1	Lavatory Sinks	1,005,210				3	\$417.16	\$443.73	\$489.60	
		0				0	\$0.00	\$0.00	\$0.00	
		0				0	\$0.00	\$0.00	\$0.00	
ECO1 TOTAL:		1,005,210		0	0	3	\$417.16	\$443.73	\$489.60	
2	Misc. Sinks	240,900				1	\$1.00	\$6.79	\$9.70	
		0				0	\$0.00	\$0.00	\$0.00	
		0				0	\$0.00	\$0.00	\$0.00	
ECO2 TOTAL:		240,900		0	0	1	\$1.00	\$6.79	\$9.70	
3	Water Closets	30,400					\$12.62	\$12.62	\$120.10	
		0					\$0.00	\$0.00	\$0.00	
		0					\$0.00	\$0.00	\$0.00	
ECO3 TOTAL:		30,400					\$12.62	\$12.62	\$120.10	
4	Urinals	34,493					\$14.31	\$14.31	\$63.65	
		0					\$0.00	\$0.00	\$0.00	
		0					\$0.00	\$0.00	\$0.00	
ECO4 TOTAL:		34,493					\$14.31	\$14.31	\$63.65	
5	Shower Heads	0				0	\$0.00	\$0.00	\$0.00	
		0				0	\$0.00	\$0.00	\$0.00	
		0				0	\$0.00	\$0.00	\$0.00	
ECO5 TOTAL:		0		0	0	0	\$0.00	\$0.00	\$0.00	
6	Equipment Related	0				0	\$0.00	\$0.00	\$0.00	
		0				0	\$0.00	\$0.00	\$0.00	
		0				0	\$0.00	\$0.00	\$0.00	
		0				0	\$0.00	\$0.00	\$0.00	
ECO6 TOTAL:		0		0	0	0	\$0.00	\$0.00	\$0.00	

SYSTEMS CORP

Systems Engineering and Management Corporation, Knoxville, TN

CALCULATION WORK SHEET 2

FACILITY NO.: 72 Water Rate: 0.42 \$/KL Energy Rate: \$/KWH

Gas Rate: 10.51 \$/MWH Demand Rate: \$/KW

ECO Number	Annual Water Saving	LPY	Annual Energy Saving			WATER		Total	Total
ECO Type			ELEC KW	ELEC KWH	GAS MWH	Dollar Saving	Dollar Saving	Dollar Saving	Dollars Invested
1	358,020				1	\$148.58	\$157.18	\$979.20	
Lavatory Sinks	0				0	\$0.00	\$0.00	\$0.00	\$0.00
ECO1 TOTAL:	358,020		0	0	1	\$148.58	\$157.18	\$979.20	
2	0				0	\$0.00	\$0.00	\$0.00	
Misc. Sinks									
ECO2 TOTAL:	0		0	0	0	\$0.00	\$0.00	\$0.00	\$0.00
3	129,600					\$53.78	\$53.78	\$2,514.96	
Water Closets									
ECO3 TOTAL:	129,600					\$53.78	\$53.78	\$2,514.96	
4	0					\$0.00	\$0.00	\$0.00	
Urinals									
ECO4 TOTAL:	0					\$0.00	\$0.00	\$0.00	\$0.00
5	0				0	\$0.00	\$0.00	\$0.00	
Shower Heads									
ECO5 TOTAL:	0		0	0	0	\$0.00	\$0.00	\$0.00	\$0.00
6									
Equipment Related									
ECO6 TOTAL:	0		0	0	0	\$0.00	\$0.00	\$0.00	\$0.00

SYSTEMS CORP

Systems Engineering and Management Corporation, Knoxville, TN

FY94S EEAP FT. KNOX WATER CONSERVATION STUDY										1	2
CALCULATION WORK SHEET 1										DATE: 29 Oct 94	
FACILITY NO.:		73		FUNCTION:		Maintenance					
Occupancy:		8		Operating Hours:		8					
ECO Number ECO Type	Existing Fixture System		Retrofited Fixture System		Usage HRS/YR	Fixtures Quantity	Water Leaks Eliminated LPY				
	Description	LPM	Description	LPM							
1 Lavatory Sinks	Public Lavatory	9.5	Spring Loaded Faucets	4.7	730	4					
ECO1 TOTAL:											
2 Misc. Sinks	Service Sink	11	Install Aerators	9.5	730	1				0	
ECO2 TOTAL:											
3 Water Closets	Floor Mounted Flush Valve	17	Install 3.5 GPF Flush Valve Repair Kit	13.2	3000	4					
ECO3 TOTAL:											
4 Urinals	Wall Mounted Flush Valve	5.68	Install 1.0 GPF Flush Valve Repair Kit	3.79	18250	2					
ECO4 TOTAL:											
5 Shower Heads											
ECO5 TOTAL:											
6 Equipment Related											
ECO6 TOTAL:											

CALCULATION WORK SHEET 2

FACILITY NO. : 73 Water Rate: 0.42 \$/KL Energy Rate: \$/KWH

Gas Rate: 10.51 \$/MWH Demand Rate: \$/KW

ECO Number	ECO Type	Annual Water		Annual Energy Saving			WATER		Total	
		Saving	LPY	ELEC KW	ELEC KWH	GAS MWH	Dollar Saving	Dollar Saving	Dollar Saving	Dollars Invested
1	Lavatory Sinks	1,046,820				3	\$434.43	\$462.09	\$979.20	
		0				0	\$0.00	\$0.00	\$0.00	\$0.00
		0				0	\$0.00	\$0.00	\$0.00	\$0.00
ECO1 TOTAL:		1,046,820		0	0	3	\$434.43	\$462.09	\$979.20	
2	Misc. Sinks	65,700				0	\$0.27	\$1.85	\$9.70	
		0				0	\$0.00	\$0.00	\$0.00	\$0.00
		0				0	\$0.00	\$0.00	\$0.00	\$0.00
ECO2 TOTAL:		65,700		0	0	0	\$0.27	\$1.85	\$9.70	
3	Water Closets	45,600					\$18.92	\$18.92	\$240.19	
		0					\$0.00	\$0.00	\$0.00	\$0.00
		0					\$0.00	\$0.00	\$0.00	\$0.00
ECO3 TOTAL:		45,600					\$18.92	\$18.92	\$240.19	
4	Urinals	68,985					\$28.63	\$28.63	\$127.30	
		0					\$0.00	\$0.00	\$0.00	\$0.00
		0					\$0.00	\$0.00	\$0.00	\$0.00
ECO4 TOTAL:		68,985					\$28.63	\$28.63	\$127.30	
5	Shower Heads	0				0	\$0.00	\$0.00	\$0.00	\$0.00
		0				0	\$0.00	\$0.00	\$0.00	\$0.00
		0				0	\$0.00	\$0.00	\$0.00	\$0.00
ECO5 TOTAL:		0		0	0	0	\$0.00	\$0.00	\$0.00	
6	Equipment Related	0				0	\$0.00	\$0.00	\$0.00	\$0.00
		0				0	\$0.00	\$0.00	\$0.00	\$0.00
		0				0	\$0.00	\$0.00	\$0.00	\$0.00
		0				0	\$0.00	\$0.00	\$0.00	\$0.00
ECO6 TOTAL:		0		0	0	0	\$0.00	\$0.00	\$0.00	

SYSTEMS CORP

Systems Engineering and Management Corporation, Knoxville, TN

FY94S EEAP FT. KNOX WATER CONSERVATION STUDY

1 2

DATE: 31 Oct 94

CALCULATION WORK SHEET 1

Class VI

FUNCTION:

79

FACILITY NO.:

10

Operating Hours:

15

Occupancy:

ECO Number ECO Type	Existing Fixture System		Retrofited Fixture System		Usage HRS/YR	Fixtures Quantity	Water Leaks Eliminated LPY
	Description	LPM	Description	LPM			
1	Public Lavatory	9.5	Spring Loaded Faucets	4.7	130	2	
Lavatory Sinks							
ECO1 TOTAL:		LPM		LPM		2	0
2							
Misc. Sinks							
ECO2 TOTAL:							
3	Floor Mounted Flush Valve	17	Install 3.5 GPF Flush Valve	13.2	11000	2	
Water Closets							
ECO3 TOTAL:		LPF		LPF		2	0
4							
Urinals							
ECO4 TOTAL:		LPM		LPM		0	0
5							
Shower Heads							
ECO5 TOTAL:		LPM		LPM		0	0
6							
Equipment Related							
ECO6 TOTAL:						0	0

SYSTEMS CORP

Systems Engineering and Management Corporation, Knoxville, TN

CALCULATION WORK SHEET 2

FACILITY NO.: 79 Water Rate: 0.42 \$/KL Energy Rate: \$/KWH

Gas Rate: 10.51 \$/MWH Demand Rate: \$/KW

ECO Number	ECO Type	Annual Water		Annual Energy Saving				WATER		Total		Total	
		Saving	LPY	ELEC KW	ELEC KWH	GAS MWH		Dollar Saving		Dollar Saving		Dollars Invested	
1	Lavatory Sinks	93,210				0		\$38.68		\$40.92		\$489.60	
		0				0		\$0.00		\$0.00		\$0.00	
ECO1 TOTAL:		93,210		0	0	0		\$38.68		\$40.92		\$489.60	
2	Misc. Sinks	0				0		\$0.00		\$0.00		\$0.00	
ECO2 TOTAL:		0		0	0	0		\$0.00		\$0.00		\$0.00	
3	Water Closets	83,600						\$34.69		\$34.69		\$120.10	
ECO3 TOTAL:		83,600						\$34.69		\$34.69		\$120.10	
4	Urinals	0						\$0.00		\$0.00		\$0.00	
ECO4 TOTAL:		0						\$0.00		\$0.00		\$0.00	
5	Shower Heads	0				0		\$0.00		\$0.00		\$0.00	
ECO5 TOTAL:		0		0	0	0		\$0.00		\$0.00		\$0.00	
6	Equipment Related												
ECO6 TOTAL:		0		0	0	0		\$0.00		\$0.00		\$0.00	

SYSTEMS CORP

Systems Engineering and Management Corporation, Knoxville, TN

FY94S EEAP FT. KNOX WATER CONSERVATION STUDY

1 2

DATE: 29 Oct 94

CALCULATION WORK SHEET 1

FUNCTION: Maintenance

80

FACILITY NO.:

Operating Hours: 8

8

Occupancy:

ECO Number ECO Type	Existing Fixture System		Retrofited Fixture System		Usage HRS/YR	Fixtures Quantity	Water Leaks Eliminated LPY
	Description	LPM	Description	LPM			
1	Lavatory Sinks						
ECO1 TOTAL:		LPM		LPM	0	0	0
2	Misc. Sinks						
ECO2 TOTAL:		LPM		LPM	0	0	0
3	Water Closets						
ECO3 TOTAL:		LPM		LPM	0	0	0
4	Urinals						
ECO4 TOTAL:		LPM		LPM	0	0	0
5	Shower Heads						
ECO5 TOTAL:		LPM		LPM	0	0	0
6	Equipment Related						
ECO6 TOTAL:		LPM		LPM	0	0	0

FY94S EEAP FT. KNOX WATER CONSERVATION STUDY

2 OF 2

CALCULATION WORK SHEET 2

FACILITY NO. : 80 Water Rate: 0.42 \$/KL Energy Rate: \$/KWH
 Gas Rate: 10.51 \$/MWH Demand Rate: \$/KW

ECO Number	ECO Type	Annual Water		Annual Energy Saving			WATER		Total	
		Saving	LPY	ELEC KW	ELEC KWH	GAS MWH	Dollar Saving	Dollar Saving	Dollar Saving	Dollars Invested
1	Lavatory Sinks	0				0	\$0.00	\$0.00	\$0.00	\$0.00
		0				0	\$0.00	\$0.00	\$0.00	\$0.00
		0				0	\$0.00	\$0.00	\$0.00	\$0.00
ECO1 TOTAL:		0		0	0	0	\$0.00	\$0.00	\$0.00	\$0.00
2	Misc. Sinks	0				0	\$0.00	\$0.00	\$0.00	\$0.00
		0				0	\$0.00	\$0.00	\$0.00	\$0.00
		0				0	\$0.00	\$0.00	\$0.00	\$0.00
ECO2 TOTAL:		0		0	0	0	\$0.00	\$0.00	\$0.00	\$0.00
3	Water Closets	22,800					\$9.46	\$9.46	\$9.46	\$120.10
		0					\$0.00	\$0.00	\$0.00	\$0.00
		0					\$0.00	\$0.00	\$0.00	\$0.00
ECO3 TOTAL:		22,800					\$9.46	\$9.46	\$9.46	\$120.10
4	Urinals	103,477					\$42.94	\$42.94	\$42.94	\$190.94
		0					\$0.00	\$0.00	\$0.00	\$0.00
		0					\$0.00	\$0.00	\$0.00	\$0.00
ECO4 TOTAL:		103,477					\$42.94	\$42.94	\$42.94	\$190.94
5	Shower Heads	0				0	\$0.00	\$0.00	\$0.00	\$0.00
		0				0	\$0.00	\$0.00	\$0.00	\$0.00
		0				0	\$0.00	\$0.00	\$0.00	\$0.00
ECO5 TOTAL:		0		0	0	0	\$0.00	\$0.00	\$0.00	\$0.00
6	Equipment Related	0				0	\$0.00	\$0.00	\$0.00	\$0.00
		0				0	\$0.00	\$0.00	\$0.00	\$0.00
		0				0	\$0.00	\$0.00	\$0.00	\$0.00
ECO6 TOTAL:		0		0	0	0	\$0.00	\$0.00	\$0.00	\$0.00

SYSTEMS CORP

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FY94S EEAP FT. KNOX WATER CONSERVATION STUDY

1 2

DATE: 29 Oct 94

CALCULATION WORK SHEET 1

FUNCTION: Maintenance

82

FACILITY NO.:

Operating Hours: 8

8

Occupancy:

ECO Number ECO Type	Existing Fixture System		Retrofitted Fixture System		Usage HRS/YR	Fixtures Quantity	Water Leaks Eliminated LPY
	Description	LPM	Description	LPM			
1	Public Lavatory	9	Spring Loaded Faucets	4.7	730	2	
Lavatory Sinks							
ECO1 TOTAL:		LPM		LPM		2	0
2							
Misc. Sinks							
ECO2 TOTAL:		LPM		LPM			
3							
Water Closets							
ECO3 TOTAL:		LPM		LPM		0	0
4	Floor Mounted Flush Valve	17	Install 3.5 GPF Flush Valve	13.2	3000	2	
Urinals			Repair Kit				
ECO4 TOTAL:		LPM		LPM		2	0
5	Wall Mounted Flush Valve	5.68	Install 1.0 GPF Flush Valve	3.79	18250	3	
Shower Heads			Repair Kit				
ECO5 TOTAL:		LPM		LPM		3	0
6							
Equipment							
Related							
ECO6 TOTAL:		LPM		LPM		0	0

SYSTEMS CORP Systems Engineering and Management Corporation, Knoxville, TN

CALCULATION WORK SHEET 2

FACILITY NO.: 82 Water Rate: 0.42 \$/KL Energy Rate: \$/KWH

Gas Rate: 10.51 \$/MWH Demand Rate: \$/KW

ECO Number	ECO Type	Annual Water Saving LPY	Annual Energy Saving			WATER Dollar Saving	Total Dollar Saving	Total Dollars Invested
			ELEC KW	ELEC KWH	GAS MWH			
1	Lavatory Sinks	479,610			1	\$199.04	\$211.71	\$489.60
		0			0	\$0.00	\$0.00	\$0.00
		0			0	\$0.00	\$0.00	\$0.00
ECO1 TOTAL:		479,610	0	0	1	\$199.04	\$211.71	\$489.60
2	Misc. Sinks	0			0	\$0.00	\$0.00	\$0.00
		0			0	\$0.00	\$0.00	\$0.00
		0			0	\$0.00	\$0.00	\$0.00
ECO2 TOTAL:		0	0	0	0	\$0.00	\$0.00	\$0.00
3	Water Closets	22,800				\$9.46	\$9.46	\$120.10
		0				\$0.00	\$0.00	\$0.00
		0				\$0.00	\$0.00	\$0.00
ECO3 TOTAL:		22,800				\$9.46	\$9.46	\$120.10
4	Urinals	103,477				\$42.94	\$42.94	\$190.94
		0				\$0.00	\$0.00	\$0.00
		0				\$0.00	\$0.00	\$0.00
ECO4 TOTAL:		103,477				\$42.94	\$42.94	\$190.94
5	Shower Heads	0			0	\$0.00	\$0.00	\$0.00
		0			0	\$0.00	\$0.00	\$0.00
		0			0	\$0.00	\$0.00	\$0.00
ECO5 TOTAL:		0	0	0	0	\$0.00	\$0.00	\$0.00
6	Equipment Related	0			0	\$0.00	\$0.00	\$0.00
		0			0	\$0.00	\$0.00	\$0.00
		0			0	\$0.00	\$0.00	\$0.00
		0			0	\$0.00	\$0.00	\$0.00
ECO6 TOTAL:		0	0	0	0	\$0.00	\$0.00	\$0.00

SYSTEMS CORP

Systems Engineering and Management Corporation, Knoxville, TN

FY94S EEAP FT. KNOX WATER CONSERVATION STUDY										1	2
CALCULATION WORK SHEET 1										DATE:	29 Oct 94
FACILITY NO.:		94		FUNCTION:		Maintenance					
Occupancy:				Operating Hours:		8					
ECO Number	ECO Type	Existing Fixture System	Retrofited Fixture System		Usage	Fixtures	Water Leaks				
		Description	LPM	Description	HRS/YR	Quantity	Eliminated LPY				
1	Lavatory Sinks	Public Lavatory	19	Spring Loaded Faucets	730	6					
ECO1 TOTAL:			LPM			6	0				
2	Misc. Sinks	Service Sink	38	Install Aerators	730	20					
ECO2 TOTAL:			LPM								
3	Water Closets	Floor Mounted Flush Valve	17	Install 3.5 GPF Flush Valve	3000	7					
ECO3 TOTAL:			LPM			7	0				
4	Urinals	Wall Mounted Flush Valve	5.68	Install 1.0 GPF Flush Valve	18250	1					
ECO4 TOTAL:			LPM			1	0				
5	Shower Heads										
ECO5 TOTAL:			LPM			0	0				
6	Equipment Related										
ECO6 TOTAL:						0	0				

CALCULATION WORK SHEET 2

FACILITY NO.: 94 Water Rate: 0.42 \$/KL Energy Rate: \$/KWH
 Gas Rate: 10.51 \$/MWH Demand Rate: \$/KW

ECO Number	Annual Water Saving LPY	Annual Energy Saving			WATER		Total	Total
ECO Type		ELEC KW	ELEC KWH	GAS MWH	Dollar Saving	Dollar Saving	Dollars Invested	
1	4,066,830			10	\$1,687.73	\$1,795.21	\$1,468.80	
Lavatory Sinks	0			0	\$0.00	\$0.00	\$0.00	
	0			0	\$0.00	\$0.00	\$0.00	
ECO1 TOTAL:	4,066,830	0	0	10	\$1,687.73	\$1,795.21	\$1,468.80	
2	24,966,000			57	\$103.61	\$703.39	\$193.92	
Misc. Sinks	0			0	\$0.00	\$0.00	\$0.00	
	0			0	\$0.00	\$0.00	\$0.00	
ECO2 TOTAL:	24,966,000	0	0	57	\$103.61	\$703.39	\$193.92	
3	79,800				\$33.12	\$33.12	\$420.34	
Water Closets	0				\$0.00	\$0.00	\$0.00	
	0				\$0.00	\$0.00	\$0.00	
ECO3 TOTAL:	79,800				\$33.12	\$33.12	\$420.34	
4	34,493				\$14.31	\$14.31	\$63.65	
Urinals	0				\$0.00	\$0.00	\$0.00	
	0				\$0.00	\$0.00	\$0.00	
ECO4 TOTAL:	34,493				\$14.31	\$14.31	\$63.65	
5	0			0	\$0.00	\$0.00	\$0.00	
Shower Heads	0			0	\$0.00	\$0.00	\$0.00	
	0			0	\$0.00	\$0.00	\$0.00	
ECO5 TOTAL:	0	0	0	0	\$0.00	\$0.00	\$0.00	
6	0			0	\$0.00	\$0.00	\$0.00	
Equipment	0			0	\$0.00	\$0.00	\$0.00	
Related	0			0	\$0.00	\$0.00	\$0.00	
	0			0	\$0.00	\$0.00	\$0.00	
ECO6 TOTAL:	0	0	0	0	\$0.00	\$0.00	\$0.00	

SYSTEMS CORP

Systems Engineering and Management Corporation, Knoxville, TN

FY94S EEAP FT. KNOX WATER CONSERVATION STUDY

12

CALCULATION WORK SHEET 1

DATE: 29 Oct 94

FACILITY NO. : 98

FUNCTION: Maintenance

Occupancy: 8

Operating Hours: 8

ECO Number	ECO Type	Existing Fixture System	Retrofitted Fixture System	Usage	Fixtures	Water Leaks
		Description	Description	HRS/YR	Quantity	Eliminated LPY
1	Lavatory Sinks	Public Lavatory	Spring Loaded Faucets	34	730	2
ECO1 TOTAL:				LPM	2	0
2	Misc. Sinks					
ECO2 TOTAL:						
3	Water Closets	Floor Mounted Flush Valve	Install 3.5 GPF Flush Valve	17	3000	2
			Repair Kit			
ECO3 TOTAL:				LPM	2	0
4	Urinals	Wall Mounted Flush Valve	Install 1.0 GPF Flush Valve	5.68	18250	2
			Repair Kit			
ECO4 TOTAL:				LPM	2	0
5	Shower Heads					
ECO5 TOTAL:				LPM	0	0
6	Equipment Related					
ECO6 TOTAL:					0	0

CALCULATION WORK SHEET 2

FACILITY NO. : 98 Water Rate: 0.42 \$/KL Energy Rate: \$/KWH
 Gas Rate: 10.51 \$/MWH Demand Rate: \$/KW

ECO Number	ECO Type	Annual Water Saving LPY	Annual Energy Saving			WATER		Total	
			ELEC KW	ELEC KWH	GAS MWH	Dollar Saving	Dollar Saving	Dollar Saving	Dollars Invested
1	Lavatory Sinks	744,600			2	\$309.01	\$328.69	\$328.69	\$489.60
		0			0	\$0.00	\$0.00	\$0.00	\$0.00
		0			0	\$0.00	\$0.00	\$0.00	\$0.00
ECO1 TOTAL:		744,600	0	0	2	\$309.01	\$328.69	\$328.69	\$489.60
2	Misc. Sinks	0			0	\$0.00	\$0.00	\$0.00	\$0.00
		0			0	\$0.00	\$0.00	\$0.00	\$0.00
		0			0	\$0.00	\$0.00	\$0.00	\$0.00
ECO2 TOTAL:		0	0	0	0	\$0.00	\$0.00	\$0.00	\$0.00
3	Water Closets	22,800				\$9.46	\$9.46	\$9.46	\$120.10
		0				\$0.00	\$0.00	\$0.00	\$0.00
		0				\$0.00	\$0.00	\$0.00	\$0.00
ECO3 TOTAL:		22,800				\$9.46	\$9.46	\$9.46	\$120.10
4	Urinals	68,985				\$28.63	\$28.63	\$28.63	\$127.30
		0				\$0.00	\$0.00	\$0.00	\$0.00
		0				\$0.00	\$0.00	\$0.00	\$0.00
ECO4 TOTAL:		68,985				\$28.63	\$28.63	\$28.63	\$127.30
5	Shower Heads	0			0	\$0.00	\$0.00	\$0.00	\$0.00
		0			0	\$0.00	\$0.00	\$0.00	\$0.00
		0			0	\$0.00	\$0.00	\$0.00	\$0.00
ECO5 TOTAL:		0	0	0	0	\$0.00	\$0.00	\$0.00	\$0.00
6	Equipment Related	0			0	\$0.00	\$0.00	\$0.00	\$0.00
		0			0	\$0.00	\$0.00	\$0.00	\$0.00
		0			0	\$0.00	\$0.00	\$0.00	\$0.00
		0			0	\$0.00	\$0.00	\$0.00	\$0.00
ECO6 TOTAL:		0	0	0	0	\$0.00	\$0.00	\$0.00	\$0.00

SYSTEMS CORP

Systems Engineering and Management Corporation, Knoxville, TN

FY94S EEAP FT. KNOX WATER CONSERVATION STUDY

1 2

DATE: 29 Oct 94

CALCULATION WORK SHEET 1

FUNCTION: Maintenance

100

FACILITY NO.:

Operating Hours: 8

Occupancy:

ECO Number ECO Type	Existing Fixture System		Retrofited Fixture System		Usage HRS/YR	Fixtures Quantity	Water Leaks Eliminated LPY
	Description	LPM	Description	LPM			
1	Public Lavatory	15	Spring Loaded Faucets	4.7	730	3	
Lavatory Sinks							
ECO1 TOTAL:		LPM		LPM		3	0
2							
Misc. Sinks							
ECO2 TOTAL:							
3	Floor Mounted Flush Valve	17	Install 3.5 GPF Flush Valve	LPF	#FL/YR	0	0
Water Closets			Repair Kit		3000	2	
ECO3 TOTAL:		LPF		LPF	#FL/YR	2	0
4	Wall Mounted Flush Valve	5.68	Install 1.0 GPF Flush Valve	3.79	18250	1	
Urinals			Repair Kit				
ECO4 TOTAL:		LPM		LPM	HRS/YR	1	0
5							
Shower Heads							
ECO5 TOTAL:		LPM		LPM		0	0
6							
Equipment Related							
ECO6 TOTAL:						0	0

SYSTEMS CORP Systems Engineering and Management Corporation, Knoxville, TN

CALCULATION WORK SHEET 2

FACILITY NO.: 100 Water Rate: 0.42 \$/KL Energy Rate: \$/KWH

Gas Rate: 10.51 \$/MWH Demand Rate: \$/KW

ECO Number	Annual Water Saving LPY	Annual Energy Saving			WATER		Total	Total
ECO Type	Saving LPY	ELEC KW	ELEC KWH	GAS MWH	Dollar Saving	Dollar Saving	Dollar Saving	Dollars Invested
1 Lavatory Sinks	1,507,815			4	\$625.74	\$665.59	\$665.59	\$734.40
	0			0	\$0.00	\$0.00	\$0.00	\$0.00
	0			0	\$0.00	\$0.00	\$0.00	\$0.00
ECO1 TOTAL:	1,507,815	0	0	4	\$625.74	\$665.59	\$665.59	\$734.40
2 Misc. Sinks	0			0	\$0.00	\$0.00	\$0.00	\$0.00
	0			0	\$0.00	\$0.00	\$0.00	\$0.00
	0			0	\$0.00	\$0.00	\$0.00	\$0.00
ECO2 TOTAL:	0	0	0	0	\$0.00	\$0.00	\$0.00	\$0.00
3 Water Closets	22,800				\$9.46	\$9.46	\$9.46	\$120.10
	0				\$0.00	\$0.00	\$0.00	\$0.00
	0				\$0.00	\$0.00	\$0.00	\$0.00
ECO3 TOTAL:	22,800				\$9.46	\$9.46	\$9.46	\$120.10
4 Urinals	34,493				\$14.31	\$14.31	\$14.31	\$63.65
	0				\$0.00	\$0.00	\$0.00	\$0.00
	0				\$0.00	\$0.00	\$0.00	\$0.00
ECO4 TOTAL:	34,493				\$14.31	\$14.31	\$14.31	\$63.65
5 Shower Heads	0			0	\$0.00	\$0.00	\$0.00	\$0.00
	0			0	\$0.00	\$0.00	\$0.00	\$0.00
	0			0	\$0.00	\$0.00	\$0.00	\$0.00
ECO5 TOTAL:	0	0	0	0	\$0.00	\$0.00	\$0.00	\$0.00
6 Equipment Related	0			0	\$0.00	\$0.00	\$0.00	\$0.00
	0			0	\$0.00	\$0.00	\$0.00	\$0.00
	0			0	\$0.00	\$0.00	\$0.00	\$0.00
	0			0	\$0.00	\$0.00	\$0.00	\$0.00
ECO6 TOTAL:	0	0	0	0	\$0.00	\$0.00	\$0.00	\$0.00

SYSTEMS CORP

Systems Engineering and Management Corporation, Knoxville, TN

FY94S EEAP FT. KNOX WATER CONSERVATION STUDY										1	2
CALCULATION WORK SHEET 1										DATE:	29 Oct 94
FACILITY NO.:		101		FUNCTION:		Maintenance					
Occupancy:		10		Operating Hours:		8					
ECO Number	ECO Type	Existing Fixture System	Description	LPM	Retrofited Fixture System	Description	LPM	Usage	Fixtures	Water Leaks	
1	Lavatory Sinks		Public Lavatory	9.5		Spring Loaded Faucets	4.7	730	2		
ECO1 TOTAL:				LPM			LPM		2	0	
2	Misc. Sinks										
ECO2 TOTAL:											
3	Water Closets		Floor Mounted Flush Valve	17		Install 3.5 GPF Flush Valve	13.2	3000	3	0	
						Repair Kit					
ECO3 TOTAL:				LPM			LPM	#FL/YR	3	0	
4	Urinals		Wall Mounted Flush Valve	5.68		Install 1.0 GPF Flush Valve	3.79	18250	2		
						Repair Kit					
ECO4 TOTAL:				LPM			LPM	HRS/YR	2	0	
5	Shower Heads										
ECO5 TOTAL:				LPM			LPM		0	0	
6	Equipment Related										
ECO6 TOTAL:									0	0	

SYSTEMS CORP

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CALCULATION WORK SHEET 2

FACILITY NO.: 101 Water Rate: 0.42 \$/KL Energy Rate: \$/KWH
 Gas Rate: 10.51 \$/MWH Demand Rate: \$/KW

ECO Number	Annual Water Saving LPY	Annual Energy Saving			WATER		Total	Total
ECO Type		ELEC KW	ELEC KWH	GAS MWH	Dollar Saving	Dollar Saving	Dollar Saving	Dollars Invested
1	523,410			1	\$217.22	\$231.05	\$489.60	
Lavatory Sinks	0			0	\$0.00	\$0.00	\$0.00	\$0.00
	0			0	\$0.00	\$0.00	\$0.00	\$0.00
ECO1 TOTAL:	523,410	0	0	1	\$217.22	\$231.05	\$489.60	
2	0			0	\$0.00	\$0.00	\$0.00	\$0.00
Misc. Sinks	0			0	\$0.00	\$0.00	\$0.00	\$0.00
	0			0	\$0.00	\$0.00	\$0.00	\$0.00
ECO2 TOTAL:	0	0	0	0	\$0.00	\$0.00	\$0.00	\$0.00
3	34,200				\$14.19	\$14.19	\$180.14	
Water Closets	0				\$0.00	\$0.00	\$0.00	\$0.00
	0				\$0.00	\$0.00	\$0.00	\$0.00
ECO3 TOTAL:	34,200				\$14.19	\$14.19	\$180.14	
4	68,985				\$28.63	\$28.63	\$127.30	
Urinals	0				\$0.00	\$0.00	\$0.00	\$0.00
	0				\$0.00	\$0.00	\$0.00	\$0.00
ECO4 TOTAL:	68,985				\$28.63	\$28.63	\$127.30	
5	0			0	\$0.00	\$0.00	\$0.00	\$0.00
Shower Heads	0			0	\$0.00	\$0.00	\$0.00	\$0.00
	0			0	\$0.00	\$0.00	\$0.00	\$0.00
ECO5 TOTAL:	0	0	0	0	\$0.00	\$0.00	\$0.00	\$0.00
6	0			0	\$0.00	\$0.00	\$0.00	\$0.00
Equipment	0			0	\$0.00	\$0.00	\$0.00	\$0.00
Related	0			0	\$0.00	\$0.00	\$0.00	\$0.00
	0			0	\$0.00	\$0.00	\$0.00	\$0.00
ECO6 TOTAL:	0	0	0	0	\$0.00	\$0.00	\$0.00	\$0.00

SYSTEMS CORP

Systems Engineering and Management Corporation, Knoxville, TN

FY94S EEAP FT. KNOX WATER CONSERVATION STUDY

1 2

CALCULATION WORK SHEET 1

DATE: 29 Oct 94

FACILITY NO. : 119

FUNCTION: Maintenance

Occupancy: 15

Operating Hours: 8

ECO Number ECO Type	Existing Fixture System Description	LPM	Retrofited Fixture System Description	LPM	Usage HRS/YR	Fixtures Quantity	Water Leaks Eliminated LPY
1	Public Lavatory	15	Spring Loaded Faucets	4.7	730	6	
Lavatory Sinks							
ECO1 TOTAL:		LPM		LPM		6	0
2							
Misc. Sinks							
ECO2 TOTAL:		LPM		LPM		0	0
3	Floor Mounted Flush Valve	17	Install 3.5 GPF Flush Valve	13.2	18250	5	
Water Closets							
ECO3 TOTAL :		LPM		LPM		5	0
4	Wall Mounted Flush Valve	5.68	Install 1.0 GPF Flush Valve	3.79	18250	3	
Urinals							
ECO4 TOTAL :		LPM		LPM		3	0
5							
Shower Heads							
ECO5 TOTAL :		LPM		LPM		0	0
6							
Equipment Related							
ECO6 TOTAL :						0	0

CALCULATION WORK SHEET 2

FACILITY NO.: 119 Water Rate: 0.42 \$/KL Energy Rate: \$/KWH

Gas Rate: 10.51 \$/MWH Demand Rate: \$/KW

ECO Number	Annual Water Saving LPY	Annual Energy Saving			WATER		Total	Total
ECO Type		ELEC KW	ELEC KWH	GAS MWH	Dollar Saving		Dollar Saving	Dollars Invested
1	3,015,630			8	\$1,251.49		\$1,331.18	\$1,468.80
Lavatory Sinks	0			0	\$0.00		\$0.00	\$0.00
	0			0	\$0.00		\$0.00	\$0.00
ECO1 TOTAL:	3,015,630	0	0	8	\$1,251.49		\$1,331.18	\$1,468.80
2	0			0	\$0.00		\$0.00	\$0.00
Misc. Sinks	0			0	\$0.00		\$0.00	\$0.00
	0			0	\$0.00		\$0.00	\$0.00
ECO2 TOTAL:	0	0	0	0	\$0.00		\$0.00	\$0.00
3	346,750				\$143.90		\$143.90	\$300.24
Water Closets	0				\$0.00		\$0.00	\$0.00
	0				\$0.00		\$0.00	\$0.00
ECO3 TOTAL:	346,750				\$143.90		\$143.90	\$300.24
4	103,477				\$42.94		\$42.94	\$190.94
Urinals	0				\$0.00		\$0.00	\$0.00
	0				\$0.00		\$0.00	\$0.00
ECO4 TOTAL:	103,477				\$42.94		\$42.94	\$190.94
5	0			0	\$0.00		\$0.00	\$0.00
Shower Heads	0			0	\$0.00		\$0.00	\$0.00
	0			0	\$0.00		\$0.00	\$0.00
ECO5 TOTAL:	0	0	0	0	\$0.00		\$0.00	\$0.00
6	0			0	\$0.00		\$0.00	\$0.00
Equipment	0			0	\$0.00		\$0.00	\$0.00
Related	0			0	\$0.00		\$0.00	\$0.00
	0			0	\$0.00		\$0.00	\$0.00
ECO6 TOTAL:	0	0	0	0	\$0.00		\$0.00	\$0.00

SYSTEMS CORP

Systems Engineering and Management Corporation, Knoxville, TN

FY94S EEAP FT. KNOX WATER CONSERVATION STUDY										1	2
CALCULATION WORK SHEET 1										DATE:	31 Oct 94
FACILITY NO.:		121		FUNCTION:		Commissary					
Occupancy:				Operating Hours:		24					
ECO Number ECO Type	Existing Fixture System Description	LPM	Retrofited Fixture System Description	LPM	Usage HRS/YR	Fixtures Quantity	Water Leaks Eliminated LPY				
1 Lavatory Sinks	Public Lavatory	15	Spring Loaded Faucets	4.7	130	14					
ECO1 TOTAL:		LPM		LPM		14	0				
2 Misc. Sinks	Service Sink	45	Install Aerators	9.5	183	5					
ECO2 TOTAL:		LPM		LPM							
3 Water Closets	Floor Mounted Flush Valve	17	Install 3.5 GPF Flush Valve	13.2	14000	10	0				
ECO3 TOTAL:		LPM		LPM		10	0				
4 Urinals	Wall Mounted Flush Valve	5.68	Install 1.0 GPF Flush Valve	3.79	29000	4					
ECO4 TOTAL:		LPM		LPM		4	0				
5 Shower Heads											
ECO5 TOTAL:		LPM		LPM		0	0				
6 Equipment Related											
ECO6 TOTAL:						0	0				

CALCULATION WORK SHEET 2

FACILITY NO.: 121 Water Rate: 0.42 \$/KL Energy Rate: \$/KWH

Gas Rate: 10.51 \$/MWH Demand Rate: \$/KW

ECO Number	ECO Type	Annual Water Saving LPY	Annual Energy Saving			WATER		Total	
			ELEC KW	ELEC KWH	GAS MWH	Dollar Saving		Dollar Saving	
1	Lavatory Sinks	1,253,070			3	\$520.02	\$550.13	\$3,427.20	
		0			0	\$0.00	\$0.00	\$0.00	
ECO1 TOTAL:		1,253,070	0	0	3	\$520.02	\$550.13	\$3,427.20	
2	Misc. Sinks	1,948,950			4	\$8.09	\$54.91	\$48.48	
ECO2 TOTAL:		1,948,950	0	0	4	\$8.09	\$54.91	\$48.48	
3	Water Closets	532,000				\$220.78	\$220.78	\$600.48	
ECO3 TOTAL:		532,000				\$220.78	\$220.78	\$600.48	
4	Urinals	219,240				\$90.98	\$90.98	\$254.59	
ECO4 TOTAL:		219,240				\$90.98	\$90.98	\$254.59	
5	Shower Heads	0			0	\$0.00	\$0.00	\$0.00	
ECO5 TOTAL:		0	0	0	0	\$0.00	\$0.00	\$0.00	
6	Equipment Related								
ECO6 TOTAL:		0	0	0	0	\$0.00	\$0.00	\$0.00	

SYSTEMS CORP

Systems Engineering and Management Corporation, Knoxville, TN

FY94S EEAP FT. KNOX WATER CONSERVATION STUDY

1 2

DATE: 29 Oct 94

CALCULATION WORK SHEET 1

FUNCTION: Maintenance

158

FACILITY NO.:

Operating Hours: 8

Occupancy:

ECO Number ECO Type	Existing Fixture System		Retrofited Fixture System		Usage HRS/YR	Fixtures Quantity	Water Leaks Eliminated LPY
	Description	LPM	Description	LPM			
1	Public Lavatory	37.9	Spring Loaded Faucets	4.7	730	4	
Lavatory Sinks							
ECO1 TOTAL:		LPM		LPM		4	0
2							
Misc. Sinks							
ECO2 TOTAL:		LPM		LPM			
3	Floor Mounted Flush Valve	17	Install 3.5 GPF Flush Valve	13.2	3000	6	
Water Closets							
			Repair Kit				
ECO3 TOTAL:		LPM		LPM		6	0
4	Wall Mounted Flush Valve	5.68	Install 1.0 GPF Flush Valve	3.79	18250	2	
Urinals							
			Repair Kit				
ECO4 TOTAL:		LPM		LPM		2	0
5							
Shower Heads							
ECO5 TOTAL:		LPM		LPM		0	0
6							
Equipment Related							
ECO6 TOTAL:						0	0

SYSTEMS CORP

Systems Engineering and Management Corporation, Knoxville, TN

CALCULATION WORK SHEET 2

FACILITY NO.: 158 Water Rate: 0.42 \$/KL Energy Rate: \$/KWH

Gas Rate: 10.51 \$/MWH Demand Rate: \$/KW

ECO Number	Annual Water Saving LPY	Annual Energy Saving			WATER		Total	
ECO Type		ELEC KW	ELEC KWH	GAS MWH	Dollar Saving	Dollar Saving	Dollar Saving	Dollars Invested
1	6,022,500			15	\$2,499.34	\$2,658.49	\$979.20	
Lavatory Sinks	0			0	\$0.00	\$0.00	\$0.00	\$0.00
	0			0	\$0.00	\$0.00	\$0.00	\$0.00
ECO1 TOTAL:	6,022,500	0	0	15	\$2,499.34	\$2,658.49	\$979.20	
2	0			0	\$0.00	\$0.00	\$0.00	\$0.00
Misc. Sinks	0			0	\$0.00	\$0.00	\$0.00	\$0.00
	0			0	\$0.00	\$0.00	\$0.00	\$0.00
ECO2 TOTAL:	0	0	0	0	\$0.00	\$0.00	\$0.00	\$0.00
3	68,400				\$28.39	\$28.39	\$360.29	
Water Closets	0				\$0.00	\$0.00	\$0.00	\$0.00
	0				\$0.00	\$0.00	\$0.00	\$0.00
ECO3 TOTAL:	68,400				\$28.39	\$28.39	\$360.29	
4	68,985				\$28.63	\$28.63	\$127.30	
Urinals	0				\$0.00	\$0.00	\$0.00	\$0.00
	0				\$0.00	\$0.00	\$0.00	\$0.00
ECO4 TOTAL:	68,985				\$28.63	\$28.63	\$127.30	
5	0			0	\$0.00	\$0.00	\$0.00	\$0.00
Shower Heads	0			0	\$0.00	\$0.00	\$0.00	\$0.00
	0			0	\$0.00	\$0.00	\$0.00	\$0.00
ECO5 TOTAL:	0	0	0	0	\$0.00	\$0.00	\$0.00	\$0.00
6	0			0	\$0.00	\$0.00	\$0.00	\$0.00
Equipment	0			0	\$0.00	\$0.00	\$0.00	\$0.00
Related	0			0	\$0.00	\$0.00	\$0.00	\$0.00
	0			0	\$0.00	\$0.00	\$0.00	\$0.00
ECO6 TOTAL:	0	0	0	0	\$0.00	\$0.00	\$0.00	\$0.00

SYSTEMS CORP

Systems Engineering and Management Corporation, Knoxville, TN

FY94S EEAP FT. KNOX WATER CONSERVATION STUDY

1 2

CALCULATION WORK SHEET 1

DATE: 29 Oct 94

FUNCTION: Maintenance

171

FACILITY NO. :

Operating Hours: 8

2

Occupancy:

ECO Number ECO Type	Existing Fixture System		Retrofited Fixture System		Usage HRS/YR	Fixtures Quantity	Water Leaks Eliminated LPY
	Description	LPM	Description	LPM			
1	Public Lavatory	9.5	Spring Loaded Faucets	4.7	730	1	
Lavatory Sinks							
ECO1 TOTAL:		LPM		LPM		1	0
2	Service Sink	27	Install Aerators	9.5	730	1	
Misc. Sinks							
ECO2 TOTAL:		LPM		LPM			
3	Floor Mounted Flush Valve	17	Install 3.5 GPF Flush Valve	13.2	3000	1	
Water Closets							
			Repair Kit				
ECO3 TOTAL:		LPM		LPM		1	0
4	Wall Mounted Flush Valve	5.68	Install 1.0 GPF Flush Valve	3.79	18250	1	
Urinals							
			Repair Kit				
ECO4 TOTAL:		LPM		LPM		1	0
5							
Shower Heads							
ECO5 TOTAL:		LPM		LPM		0	0
6							
Equipment Related							
ECO6 TOTAL:						0	0

SYSTEMS CORP Systems Engineering and Management Corporation, Knoxville, TN

CALCULATION WORK SHEET 2

FACILITY NO.: 171
 Water Rate: 0.42 \$/KL Energy Rate: \$/KWH
 Gas Rate: 10.51 \$/MWH Demand Rate: \$/KW

ECO Number	Annual Water Saving LPY	Annual Energy Saving			WATER		Total	Total
ECO Type	Saving LPY	ELEC KW	ELEC KWH	GAS MWH	Dollar Saving	Dollar Saving	Dollar Saving	Dollars Invested
1 Lavatory Sinks	261,705			1	\$108.61	\$115.52	\$115.52	\$244.80
	0			0	\$0.00	\$0.00	\$0.00	\$0.00
	0			0	\$0.00	\$0.00	\$0.00	\$0.00
ECO1 TOTAL:	261,705	0	0	1	\$108.61	\$115.52	\$115.52	\$244.80
2 Misc. Sinks	766,500			2	\$3.18	\$21.60	\$21.60	\$9.70
	0			0	\$0.00	\$0.00	\$0.00	\$0.00
	0			0	\$0.00	\$0.00	\$0.00	\$0.00
ECO2 TOTAL:	766,500	0	0	2	\$3.18	\$21.60	\$21.60	\$9.70
3 Water Closets	11,400				\$4.73	\$4.73	\$4.73	\$60.05
	0				\$0.00	\$0.00	\$0.00	\$0.00
	0				\$0.00	\$0.00	\$0.00	\$0.00
ECO3 TOTAL:	11,400				\$4.73	\$4.73	\$4.73	\$60.05
4 Urinals	34,493				\$14.31	\$14.31	\$14.31	\$63.65
	0				\$0.00	\$0.00	\$0.00	\$0.00
	0				\$0.00	\$0.00	\$0.00	\$0.00
ECO4 TOTAL:	34,493				\$14.31	\$14.31	\$14.31	\$63.65
5 Shower Heads	0			0	\$0.00	\$0.00	\$0.00	\$0.00
	0			0	\$0.00	\$0.00	\$0.00	\$0.00
	0			0	\$0.00	\$0.00	\$0.00	\$0.00
ECO5 TOTAL:	0	0	0	0	\$0.00	\$0.00	\$0.00	\$0.00
6 Equipment Related	0			0	\$0.00	\$0.00	\$0.00	\$0.00
	0			0	\$0.00	\$0.00	\$0.00	\$0.00
	0			0	\$0.00	\$0.00	\$0.00	\$0.00
	0			0	\$0.00	\$0.00	\$0.00	\$0.00
ECO6 TOTAL:	0	0	0	0	\$0.00	\$0.00	\$0.00	\$0.00

SYSTEMS CORP

Systems Engineering and Management Corporation, Knoxville, TN

FY94S EEAP FT. KNOX WATER CONSERVATION STUDY

1 2

DATE: 31 Oct 94

CALCULATION WORK SHEET 1

FACILITY NO.: 400 FUNCTION: Library
 Occupancy: Operating Hours: 9

ECO Number ECO Type	Existing Fixture System		Retrofited Fixture System		Usage HRS/YR	Fixtures Quantity	Water Leaks Eliminated LPY
	Description	LPM	Description	LPM			
1	Public Lavatory	9.5	Spring Loaded Faucets	4.7	130	3	
	Public Lavatory	15	Spring Loaded Faucets	4.7	130	2	
ECO1 TOTAL:		LPM		LPM	5	0	
2							
Misc. Sinks							
ECO2 TOTAL:							
3	Floor Mounted Flush Valve	17	Install 3.5 GPF Flush Valve	13.2	1300	5	0
Water Closets			Repair Kit				
ECO3 TOTAL:		LPF		LPF	#FL/YR	0	0
4	Wall Mounted Flush Valve	5.68	Install 1.0 GPF Flush Valve	3.79	1300	2	
Urinals			Repair Kit				
ECO4 TOTAL:		LPM		LPM	HRS/YR	2	0
5							
Shower Heads							
ECO5 TOTAL:		LPM		LPM		0	0
6							
Equipment							
Related							
ECO6 TOTAL:						0	0

FY94S EEAP FT. KNOX WATER CONSERVATION STUDY

2 OF 2

CALCULATION WORK SHEET 2

FACILITY NO.: 400 Water Rate: 0.42 \$/KL Energy Rate: \$/KWH

Gas Rate: 10.51 \$/MWH Demand Rate: \$/KW

ECO Number	ECO Type	Annual Water Saving LPY	Annual Energy Saving			WATER	Total	
			ELEC KW	ELEC KWH	GAS MWH		Dollar Saving	Dollars Invested
1	Lavatory Sinks	139,815			0	\$58.02	\$61.38	\$734.40
		179,010			0	\$74.29	\$78.59	\$489.60
ECO1 TOTAL:		318,825	0	0	1	\$132.31	\$139.97	\$1,224.00
2	Misc. Sinks	0			0	\$0.00	\$0.00	\$0.00
ECO2 TOTAL:		0	0	0	0	\$0.00	\$0.00	\$0.00
3	Water Closets	24,700				\$10.25	\$10.25	\$300.24
ECO3 TOTAL:		24,700				\$10.25	\$10.25	\$300.24
4	Urinals	4,914				\$2.04	\$2.04	\$127.30
ECO4 TOTAL:		4,914				\$2.04	\$2.04	\$127.30
5	Shower Heads	0			0	\$0.00	\$0.00	\$0.00
ECO5 TOTAL:		0	0	0	0	\$0.00	\$0.00	\$0.00
6	Equipment Related							
ECO6 TOTAL:		0	0	0	0	\$0.00	\$0.00	\$0.00

SYSTEMS CORP

Systems Engineering and Management Corporation, Knoxville, TN

FY94S EEAP FT. KNOX WATER CONSERVATION STUDY										1	2
CALCULATION WORK SHEET 1										DATE:	31 Oct 94
FACILITY NO. :		469		FUNCTION:		Firehall/Turrett News					
Occupancy:		27		Operating Hours:		24					
ECO Number	ECO Type	Existing Fixture System		Retrofited Fixture System		Usage	Fixtures	Water Leaks			
		Description	LPM	Description	LPM	HRS/YR	Quantity	Eliminated LPY			
1	Lavatory Sinks	Public Lavatory	9.5	Spring Loaded Faucets	4.7	365	9				
ECO1 TOTAL:											
2	Misc. Sinks	Laundry	45	Install Aerators	9.5	365	2				
ECO2 TOTAL:											
3	Water Closets	Floor Mounted Flush Valve	17	Install 3.5 GPF Flush Valve	13.2	3800	8				
ECO3 TOTAL:											
4	Urinals	Wall Mounted Flush Valve	5.68	Install 1.0 GPF Flush Valve	3.79	3800	1				
ECO4 TOTAL:											
5	Shower Heads										
ECO5 TOTAL:											
6	Equipment Related										
ECO6 TOTAL:											

CALCULATION WORK SHEET 2

FACILITY NO.: 469 Water Rate: 0.42 \$/KL Energy Rate: \$/KWH

Gas Rate: 10.51 \$/MWH Demand Rate: \$/KW

ECO Number	ECO Type	Annual Water		Annual Energy Saving			WATER		Total	
		Saving	LPY	ELEC KW	ELEC KWH	GAS MWH	Dollar Saving		Dollar Saving	Dollars Invested
1	Lavatory Sinks	1,177,673				3	\$488.73		\$517.03	\$2,203.20
		0				0	\$0.00		\$0.00	\$0.00
ECO1 TOTAL:		1,177,673		0	0	3	\$488.73		\$517.03	\$2,203.20
2	Misc. Sinks	1,554,900				4	\$6.45		\$6.83	\$19.39
ECO2 TOTAL:		1,554,900		0	0	4	\$6.45		\$6.83	\$19.39
3	Water Closets	115,520					\$47.94		\$47.94	\$480.38
ECO3 TOTAL:		115,520					\$47.94		\$47.94	\$480.38
4	Urinals	7,182					\$2.98		\$2.98	\$63.65
ECO4 TOTAL:		7,182					\$2.98		\$2.98	\$63.65
5	Shower Heads	0				0	\$0.00		\$0.00	\$0.00
ECO5 TOTAL:		0		0	0	0	\$0.00		\$0.00	\$0.00
6	Equipment Related									
ECO6 TOTAL:		0		0	0	0	\$0.00		\$0.00	\$0.00

SYSTEMS CORP

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FY94S EEAP FT. KNOX WATER CONSERVATION STUDY

1 of 2

CALCULATION WORK SHEET 1

DATE: 29 Oct 94

FACILITY NO. : 485

FUNCTION: Maintenance

Occupancy:

Operating Hours: 8

ECO Number	Existing Fixture System	Retrofitted Fixture System	Usage	Fixtures	Water Leaks
ECO Type	Description	Description	HRS/YR	Quantity	Eliminated LPY
1	Public Lavatory	Spring Loaded Faucets	730	5	
ECO1 TOTAL:					
2				5	0
Misc. Sinks					
ECO2 TOTAL:					
3	Floor Mounted Flush Valve	Install 3.5 GPF Flush Valve	3000	5	
Water Closets		Repair Kit			
ECO3 TOTAL :					
4	Wall Mounted Flush Valve	Install 1.0 GPF Flush Valve	18250	2	
Urinals		Repair Kit			
ECO4 TOTAL :					
5				2	0
Shower Heads					
ECO5 TOTAL :					
6				0	0
Equipment					
Related					
ECO6 TOTAL :				0	0

CALCULATION WORK SHEET 2

FACILITY NO.: 485 Water Rate: 0.42 \$/KL Energy Rate: \$/KWH

Gas Rate: 10.51 \$/MWH Demand Rate: \$/KW

ECO Number	Annual Water Saving LPY	Annual Energy Saving			WATER		Total	
ECO Type		ELEC KW	ELEC KWH	GAS MWH	Dollar Saving	Dollar Saving	Dollar Saving	Dollars Invested
1								
Lavatory Sinks	6,674,025			17	\$2,769.72	\$2,946.09	\$1,224.00	
	0			0	\$0.00	\$0.00	\$0.00	\$0.00
	0			0	\$0.00	\$0.00	\$0.00	\$0.00
ECO1 TOTAL:	6,674,025	0	0	17	\$2,769.72	\$2,946.09	\$1,224.00	
2								
Misc. Sinks	0			0	\$0.00	\$0.00	\$0.00	\$0.00
	0			0	\$0.00	\$0.00	\$0.00	\$0.00
	0			0	\$0.00	\$0.00	\$0.00	\$0.00
ECO2 TOTAL:	0	0	0	0	\$0.00	\$0.00	\$0.00	\$0.00
3								
Water Closets	57,000				\$23.66	\$23.66	\$300.24	
	0				\$0.00	\$0.00	\$0.00	\$0.00
	0				\$0.00	\$0.00	\$0.00	\$0.00
ECO3 TOTAL:	57,000				\$23.66	\$23.66	\$300.24	
4								
Urinals	68,985				\$28.63	\$28.63	\$127.30	
	0				\$0.00	\$0.00	\$0.00	\$0.00
	0				\$0.00	\$0.00	\$0.00	\$0.00
ECO4 TOTAL:	68,985				\$28.63	\$28.63	\$127.30	
5								
Shower Heads	0			0	\$0.00	\$0.00	\$0.00	\$0.00
	0			0	\$0.00	\$0.00	\$0.00	\$0.00
	0			0	\$0.00	\$0.00	\$0.00	\$0.00
ECO5 TOTAL:	0	0	0	0	\$0.00	\$0.00	\$0.00	\$0.00
6								
Equipment Related	0			0	\$0.00	\$0.00	\$0.00	\$0.00
	0			0	\$0.00	\$0.00	\$0.00	\$0.00
	0			0	\$0.00	\$0.00	\$0.00	\$0.00
	0			0	\$0.00	\$0.00	\$0.00	\$0.00
ECO6 TOTAL:	0	0	0	0	\$0.00	\$0.00	\$0.00	\$0.00

SYSTEMS CORP

Systems Engineering and Management Corporation, Knoxville, TN

FY94S EEAP FT. KNOX WATER CONSERVATION STUDY

1 of 2

CALCULATION WORK SHEET 1

DATE: 31 Oct 94

FACILITY NO.: 501 FUNCTION: Enlisted Barracks

Occupancy: 37 Operating Hours: 15

ECO Number ECO Type	Existing Fixture System		Retrofited Fixture System		Usage HRS/YR	Fixtures Quantity	Water Leaks Eliminated LPY
	Description	LPM	Description	LPM			
1	Public Lavatory	9.5	Spring Loaded Faucets	4.7	730	6	
Lavatory Sinks							
ECO1 TOTAL:		LPM		LPM		6	0
2	Laundry Sink	17	Install Aerators	9.5	2080	1	
Misc. Sinks							
ECO2 TOTAL:		LPM		LPM			
3	Floor Mounted Flush Valve	17	Install 3.5 GPF Flush Valve	13.2	6000	5	
Water Closets							
			Repair Kit				
ECO3 TOTAL:		LPM		LPM		5	0
4	Wall Mounted Flush Valve	5.68	Install 1.0 GPF Flush Valve	3.79	18000	3	
Urinals							
			Repair Kit				
ECO4 TOTAL:		LPM		LPM		3	0
5							
Shower Heads							
ECO5 TOTAL:		LPM		LPM		0	0
6							
Equipment Related							
ECO6 TOTAL:						0	0

SYSTEMS CORP

Systems Engineering and Management Corporation, Knoxville, TN

CALCULATION WORK SHEET 2

FACILITY NO.: 501 Water Rate: 0.42 \$/KL Energy Rate: \$/KWH

Gas Rate: 10.51 \$/MWH Demand Rate: \$/KW

ECO Number	Annual Water Saving	Annual Water LPY	Annual Energy Saving			WATER Dollar Saving	Total Dollar Saving	Total Dollars Invested
			ELEC KW	ELEC KWH	GAS MWH			
1	1,570,230				4	\$651.65	\$689.37	\$1,468.80
Lavatory Sinks	0				0	\$0.00	\$0.00	\$0.00
ECO1 TOTAL:	1,570,230		0	0	4	\$651.65	\$689.37	\$1,468.80
2	936,000				2	\$3.88	\$26.37	\$9.70
Misc. Sinks								
ECO2 TOTAL:	936,000		0	0	2	\$3.88	\$26.37	\$9.70
3	114,000					\$47.31	\$47.31	\$300.24
Water Closets								
ECO3 TOTAL:	114,000					\$47.31	\$47.31	\$300.24
4	102,060					\$42.35	\$42.35	\$190.94
Urinals								
ECO4 TOTAL:	102,060					\$42.35	\$42.35	\$190.94
5	0				0	\$0.00	\$0.00	\$0.00
Shower Heads								
ECO5 TOTAL:	0		0	0	0	\$0.00	\$0.00	\$0.00
6								
Equipment								
Related								
ECO6 TOTAL:	0		0	0	0	\$0.00	\$0.00	\$0.00

SYSTEMS CORP

Systems Engineering and Management Corporation, Knoxville, TN

FY94S EEAP, FT. KNOX WATER CONSERVATION STUDY

CALCULATION WORK SHEET 1

DATE: 31 Oct 94

Enlisted Barracks

502

FUNCTION:

Operating Hours: 15

37

ECO Number ECO Type	Existing Fixture System Description	LPM	Retrofitted Fixture System Description	LPM	Usage HRS/YR	Fixtures Quantity	Water Leaks Eliminated LPY
1 Lavatory Sinks	Public Lavatory	9.5	Spring Loaded Faucets	4.7	730	6	
ECO1 TOTAL:		LPM		LPM		6	0
2 Misc. Sinks	Laundry Sink	17	Install Aerators	9.5	2080	1	
ECO2 TOTAL:		LPM		LPM			
3 Water Closets	Floor Mounted Flush Valve	17	Install 3.5 GPF Flush Valve Repair Kit	13.2	10804	5	
ECO3 TOTAL:		LPM		LPM			
4 Urinals	Wall Mounted Flush Valve	5.68	Install 1.0 GPF Flush Valve Repair Kit	3.79	18000	3	
ECO4 TOTAL:		LPM		LPM			
5 Shower Heads							
ECO5 TOTAL:		LPM		LPM		0	0
6 Equipment Related							
ECO6 TOTAL:						0	0

SYSTEMS CORP

Systems Engineering and Management Corporation, Knoxville, TN

CALCULATION WORK SHEET 2

FACILITY NO.: 502
 Water Rate: 0.42 \$/KL Energy Rate: \$/KWH
 Gas Rate: 10.51 \$/MWH Demand Rate: \$/KW

ECO Number	Annual Water Saving LPY	Annual Energy Saving			WATER		Total	
ECO Type		ELEC KW	ELEC KWH	GAS MWH	Dollar Saving	Dollar Saving	Dollar Saving	Dollars Invested
1 Lavatory Sinks	1,570,230 0			4 0	\$651.65 \$0.00	\$689.37 \$0.00	\$1,468.80 \$0.00	
ECO1 TOTAL:	1,570,230	0	0	4	\$651.65	\$689.37	\$1,468.80	
2 Misc. Sinks	936,000			2	\$3.88	\$26.37	\$9.70	
ECO2 TOTAL:	936,000	0	0	2	\$3.88	\$26.37	\$9.70	
3 Water Closets	205,276				\$85.19	\$85.19	\$300.24	
ECO3 TOTAL:	205,276				\$85.19	\$85.19	\$300.24	
4 Urinals	102,060				\$42.35	\$42.35	\$190.94	
ECO4 TOTAL:	102,060				\$42.35	\$42.35	\$190.94	
5 Shower Heads	0			0	\$0.00	\$0.00	\$0.00	
ECO5 TOTAL:	0	0	0	0	\$0.00	\$0.00	\$0.00	
6 Equipment Related								
ECO6 TOTAL:	0	0	0	0	\$0.00	\$0.00	\$0.00	

SYSTEMS CORP

Systems Engineering and Management Corporation, Knoxville, TN

FY94S EEAP FT. KNOX WATER CONSERVATION STUDY

1 2

CALCULATION WORK SHEET 1

DATE: 31 Oct 94

FACILITY NO.: 850

FUNCTION: Training Facility

Occupancy: 1280 Students

Operating Hours: 15

ECO Number ECO Type	Existing Fixture System		Retrofitted Fixture System		Usage HRS/YR	Fixtures Quantity	Water Leaks Eliminated LPY
	Description	LPM	Description	LPM			
1	Public Lavatory	9.5	Spring Loaded Faucets	4.7	200	8	15800
Lavatory Sinks							
ECO1 TOTAL:		LPM		LPM		8	15800
2							
Misc. Sinks							
ECO2 TOTAL:		LPF		LPF	#FL/YR	0	0
3	Floor Mounted Flush Valve	17	Install 3.5 GPF Flush Valve	13.2	1300	7	
Water Closets							
			Repair Kit				
ECO3 TOTAL:		LPF		LPF	#FL/YR	7	0
4	Wall Mounted Flush Valve	5.68	Install 1.0 GPF Flush Valve	3.79	46800	5	
Urinals							
			Repair Kit				
ECO4 TOTAL:		LPM		LPM	HRS/YR	5	0
5							
Shower Heads							
ECO5 TOTAL:		LPM		LPM		0	0
6							
Equipment Related							
ECO6 TOTAL:						0	0

SYSTEMS CORP

Systems Engineering and Management Corporation, Knoxville, TN

CALCULATION WORK SHEET 2

FACILITY NO.: 850
 Water Rate: 0.42 \$/KL Energy Rate: \$/KWH
 Gas Rate: 10.51 \$/MWH Demand Rate: \$/KW

ECO Number	Annual Water Saving LPY	Annual Energy Saving			WATER		Total	Total
ECO Type		ELEC KW	ELEC KWH	GAS MWH	Dollar Saving	Dollar Saving	Dollar Saving	Dollars Invested
1 Lavatory Sinks	589,400 0			1 0	\$244.60 \$0.00	\$258.76 \$0.00	\$1,958.40 \$0.00	
ECO1 TOTAL:	589,400	0	0	1	\$244.60	\$258.76	\$1,958.40	
2 Misc. Sinks	0			0	\$0.00	\$0.00	\$0.00	
ECO2 TOTAL:	0	0	0	0	\$0.00	\$0.00	\$0.00	
3 Water Closets	34,580				\$14.35	\$14.35	\$420.34	
ECO3 TOTAL:	34,580				\$14.35	\$14.35	\$420.34	
4 Urinals	442,260				\$183.54	\$183.54	\$318.24	
ECO4 TOTAL:	442,260				\$183.54	\$183.54	\$318.24	
5 Shower Heads	0			0	\$0.00	\$0.00	\$0.00	
ECO5 TOTAL:	0	0	0	0	\$0.00	\$0.00	\$0.00	
6 Equipment Related								
ECO6 TOTAL:	0	0	0	0	\$0.00	\$0.00	\$0.00	

SYSTEMS CORP

Systems Engineering and Management Corporation, Knoxville, TN

FY94S EEAP FT. KNOX WATER CONSERVATION STUDY

Page 2

CALCULATION WORK SHEET 1

DATE: 29 Oct 94

FACILITY NO.: 851

FUNCTION: Hospital/Dining

Occupancy: 3 Meals / Day

Operating Hours: 24

ECO Number ECO Type	Existing Fixture System		Retrofited Fixture System		Usage HRS/YR	Fixtures Quantity	Water Leaks Eliminated LPY
	Description	LPM	Description	LPM			
1	Lavatory Faucets	9.5	Spring Loaded Faucets	4.7	1095	5	
Lavatory Sinks							
ECO1 TOTAL:		LPM		LPM		5	0
2	Service Sink	22.7	Install Aerators	9.5	1095	2	
Misc. Sinks							
ECO2 TOTAL:		LPM		LPM		2	
3	Floor Mounted Flush Valve	17	Install 3.5 GPF Flush Valve	13.2	10950	7	
Water Closets							
			Repair Kit				
ECO3 TOTAL:		LPM		LPM		7	0
4	Wall Mounted Flush Valve	5.68	Install 1.0 GPF Flush Valve	3.79	10950	1	
Urinals							
			Repair Kit				
ECO4 TOTAL:		LPM		LPM		1	0
5							
Shower Heads							
ECO5 TOTAL:		LPM		LPM		0	0
6	2 Comp. Sink (2 faucets)	17	Install Aerators	9.5	2190	2	
Equipment Related							
	1 Comp. Sink (1 faucets)	22.7	Install Aerators	9.5	2190	2	
ECO6 TOTAL:						4	0

SYSTEMS CORP

Systems Engineering and Management Corporation, Knoxville, TN

CALCULATION WORK SHEET 2

FACILITY NO.: 851
 Water Rate: 0.42 \$/KL Energy Rate: \$/KWH
 Gas Rate: 10.51 \$/MWH Demand Rate: \$/KW

ECO Number	Annual Water Saving LPY	Annual Energy Saving			WATER	Total	Total
ECO Type		ELEC KW	ELEC KWH	GAS MWH	Dollar Saving	Dollar Saving	Dollars Invested
1	1,962,788			3	\$814.56	\$846.39	\$1,224.00
Lavatory Sinks	0			0	\$0.00	\$0.00	\$0.00
	0			0	\$0.00	\$0.00	\$0.00
ECO1 TOTAL:	1,962,788	0	0	3	\$814.56	\$846.39	\$1,224.00
2	1,734,480			4	\$7.20	\$48.87	\$19.39
Misc. Sinks	0			0	\$0.00	\$0.00	\$0.00
	0			0	\$0.00	\$0.00	\$0.00
ECO2 TOTAL:	1,734,480	0	0	4	\$7.20	\$48.87	\$19.39
3	291,270				\$120.88	\$120.88	\$420.34
Water Closets	0				\$0.00	\$0.00	\$0.00
	0				\$0.00	\$0.00	\$0.00
ECO3 TOTAL:	291,270				\$120.88	\$120.88	\$420.34
4	20,696				\$8.59	\$8.59	\$63.65
Urinals	0				\$0.00	\$0.00	\$0.00
	0				\$0.00	\$0.00	\$0.00
ECO4 TOTAL:	20,696				\$8.59	\$8.59	\$63.65
5	0			0	\$0.00	\$0.00	\$0.00
Shower Heads	0			0	\$0.00	\$0.00	\$0.00
	0			0	\$0.00	\$0.00	\$0.00
ECO5 TOTAL:	0	0	0	0	\$0.00	\$0.00	\$0.00
6	1,971,000			3	\$8.18	\$40.14	\$9.70
Equipment Related	3,468,960			5	\$14.40	\$70.65	\$19.39
	0			0	\$0.00	\$0.00	\$0.00
	0			0	\$0.00	\$0.00	\$0.00
	0			0	\$0.00	\$0.00	\$0.00
ECO6 TOTAL:	5,439,960	0	0	8	\$22.58	\$110.79	\$29.09

SYSTEMS CORP

Systems Engineering and Management Corporation, Knoxville, TN

FY94S EEAP FT. KNOX WATER CONSERVATION STUDY

1 2

CALCULATION WORK SHEET 1

DATE: 31 Oct 94

FACILITY NO. : 853

FUNCTION: Enlisted Barracks

Occupancy: 140

Operating Hours: 15

ECO Number ECO Type	Existing Fixture System		Retrofitted Fixture System		Usage HRS/YR	Fixtures Quantity	Water Leaks Eliminated LPY
	Description	LPM	Description	LPM			
1	Public Lavatory	9.5	Spring Loaded Faucets	4.7	730	25	
Lavatory Sinks							
ECO1 TOTAL:		LPM		LPM		25	0
2	Laundry Sink	23	Install Aerators	9.5	2080	3	
Misc. Sinks							
ECO2 TOTAL:		LPM		LPM		3	0
3	Floor Mounted Flush Valve	17	Install 3.5 GPF Flush Valve	13.2	6000	25	
Water Closets							
			Repair Kit				
ECO3 TOTAL:		LPM		LPM		25	0
4	Wall Mounted Flush Valve	5.68	Install 1.0 GPF Flush Valve	3.79	13627	15	
Urinals							
			Repair Kit				
ECO4 TOTAL:		LPM		LPM		15	0
5							
Shower Heads							
ECO5 TOTAL:		LPM		LPM		0	0
6							
Equipment Related							
ECO6 TOTAL:						0	0

SYSTEMS CORP

Systems Engineering and Management Corporation, Knoxville, TN

CALCULATION WORK SHEET 2

FACILITY NO.: 853 Water Rate: 0.42 \$/KL Energy Rate: \$/KWH

Gas Rate: 10.51 \$/MWH Demand Rate: \$/KW

ECO Number	ECO Type	Annual Water Saving LPY	Annual Energy Saving			WATER		Total	
			ELEC KW	ELEC KWH	GAS MWH	Dollar Saving	Dollar Saving	Dollar Saving	Dollars Invested
1	Lavatory Sinks	6,542,625			15	\$2,715.19	\$2,872.37	\$6,120.00	
		0			0	\$0.00	\$0.00	\$0.00	
ECO1 TOTAL:		6,542,625	0	0	15	\$2,715.19	\$2,872.37	\$6,120.00	
2	Misc. Sinks	5,054,400			12	\$20.98	\$142.40	\$29.09	
ECO2 TOTAL:		5,054,400	0	0	12	\$20.98	\$142.40	\$29.09	
3	Water Closets	570,000				\$236.55	\$236.55	\$1,501.20	
ECO3 TOTAL:		570,000				\$236.55	\$236.55	\$1,501.20	
4	Urinals	386,325				\$160.33	\$160.33	\$954.72	
ECO4 TOTAL:		386,325				\$160.33	\$160.33	\$954.72	
5	Shower Heads	0			0	\$0.00	\$0.00	\$0.00	
ECO5 TOTAL:		0	0	0	0	\$0.00	\$0.00	\$0.00	
6	Equipment Related								
ECO6 TOTAL:		0	0	0	0	\$0.00	\$0.00	\$0.00	

SYSTEMS CORP

Systems Engineering and Management Corporation, Knoxville, TN

FY94S EEAP FT. KNOX WATER CONSERVATION STUDY

CALCULATION WORK SHEET 1

DATE: 31 Oct 94

Officer (trans.)

FUNCTION:

855

FACILITY NO.:

Operating Hours: 15

24

Occupancy:

ECO Number ECO Type	Existing Fixture System		Retrofited Fixture System		Usage HRS/YR	Fixtures Quantity	Water Leaks Eliminated LPY
	Description	LPM	Description	LPM			
1	Public Lavatory	17	Spring Loaded Faucets	4.7	130	16	
Lavatory Sinks							
ECO1 TOTAL:		LPM		LPM		16	0
2							
Misc. Sinks							
ECO2 TOTAL:		LPM		LPM			
3	Tank Type	LPM		LPM			
Water Closets							
ECO3 TOTAL:		LPM		LPM		16	0
4							
Urinals							
ECO4 TOTAL:		LPM		LPM		0	0
5							
Shower Heads							
ECO5 TOTAL:		LPM		LPM		0	0
6							
Equipment Related							
ECO6 TOTAL:						0	0

SYSTEMS CORP Systems Engineering and Management Corporation, Knoxville, TN

FY94S EEAP FT. KNOX WATER CONSERVATION STUDY

2 OF 2

CALCULATION WORK SHEET 2

FACILITY NO.: 855
 Water Rate: 0.42 \$/KL Energy Rate: \$/KWH
 Gas Rate: 10.51 \$/MWH Demand Rate: \$/KW

ECO Number	Annual Water Saving	LPY	Annual Energy Saving			WATER		Total	Total
ECO Type			ELEC KW	ELEC KWH	GAS MWH	Dollar Saving	Dollar Saving	Dollar Saving	Dollars Invested
1 Lavatory Sinks	1,681,680				4	\$697.90	\$738.30	\$3,916.80	
	0				0	\$0.00	\$0.00	\$0.00	
ECO1 TOTAL:	1,681,680		0	0	4	\$697.90	\$738.30	\$3,916.80	
2 Misc. Sinks					0	\$0.00	\$0.00	\$0.00	
ECO2 TOTAL:			0	0	0	\$0.00	\$0.00	\$0.00	
3 Water Closets	157,680					\$65.44	\$65.44	\$6,706.56	
ECO3 TOTAL:	157,680					\$65.44	\$65.44	\$6,706.56	
4 Urinals	0					\$0.00	\$0.00	\$0.00	
ECO4 TOTAL:	0					\$0.00	\$0.00	\$0.00	
5 Shower Heads	0				0	\$0.00	\$0.00	\$0.00	
ECO5 TOTAL:	0		0	0	0	\$0.00	\$0.00	\$0.00	
6 Equipment Related									
ECO6 TOTAL:	0		0	0	0	\$0.00	\$0.00	\$0.00	

SYSTEMS CORP

Systems Engineering and Management Corporation, Knoxville, TN

FY94S EEAP FT. KNOX WATER CONSERVATION STUDY

1 2

DATE: 31 Oct 94

CALCULATION WORK SHEET 1

FACILITY NO.: 888

FUNCTION: Church

Occupancy:

Operating Hours:

ECO Number ECO Type	Existing Fixture System		Retrofitted Fixture System		Usage HRS/YR	Fixtures Quantity	Water Leaks Eliminated LPY
	Description	LPM	Description	LPM			
1	Public Lavatory	17	Spring Loaded Faucets	4.7	26	1	
Lavatory Sinks	Public Lavatory	9.5	Spring Loaded Faucets	4.7	26	1	
ECO1 TOTAL:		LPM		LPM		2	0
2							
Misc. Sinks							
ECO2 TOTAL:							
3	Tank Type (public)	LPF	Install 1.6 GPF Tank Type	LPF	#FL/YR	0	0
Water Closets		11.4	Water Closet	6	1300	1	
ECO3 TOTAL :		LPF		LPF	#FL/YR	1	0
4							
Urinals							
ECO4 TOTAL :							
5		LPM		LPM	HRS/YR	0	0
Shower Heads							
ECO5 TOTAL :							
6		LPM		LPM		0	0
Equipment Related							
ECO6 TOTAL :						0	0

CALCULATION WORK SHEET 2

FACILITY NO.: 888 Water Rate: 0.42 \$/KL Energy Rate: \$/KWH

Gas Rate: 10.51 \$/MWH Demand Rate: \$/KW

ECO Number	ECO Type	Annual Water		Annual Energy Saving			WATER		Total	
		Saving	LPY	ELEC KW	ELEC KWH	GAS MWH	Dollar Saving	Dollar Saving	Dollar Saving	Dollars Invested
1	Lavatory Sinks	21,021				5	\$8.72	\$59.22	\$244.80	
		9,321				2	\$3.87	\$26.26	\$244.80	
ECO1 TOTAL:		30,342		0	0	7	\$12.59	\$85.49	\$489.60	
2	Misc. Sinks	0				0	\$0.00	\$0.00	\$0.00	
ECO2 TOTAL:		0		0	0	0	\$0.00	\$0.00	\$0.00	
3	Water Closets	7,020					\$2.91	\$2.91	\$418.84	
ECO3 TOTAL:		7,020					\$2.91	\$2.91	\$418.84	
4	Urinals	0					\$0.00	\$0.00	\$0.00	
ECO4 TOTAL:		0					\$0.00	\$0.00	\$0.00	
5	Shower Heads	0				0	\$0.00	\$0.00	\$0.00	
ECO5 TOTAL:		0		0	0	0	\$0.00	\$0.00	\$0.00	
6	Equipment Related									
ECO6 TOTAL:		0		0	0	0	\$0.00	\$0.00	\$0.00	

SYSTEMS CORP

Systems Engineering and Management Corporation, Knoxville, TN

FY94S EEAP FT. KNOX WATER CONSERVATION STUDY										1	2
CALCULATION WORK SHEET 1										DATE:	31 Oct 94
FACILITY NO.:		1002		FUNCTION:		Dental Clinic					
Occupancy:				Operating Hours:		8					
ECO Number	ECO Type	Existing Fixture System	Description	Retrofitted Fixture System	LPM	Usage HRS/YR	Fixtures Quantity	Water Leaks Eliminated LPY			
1	Lavatory Sinks	Public Lavatory	15	Spring Loaded Faucets	4.7	130	30				
		Public Lavatory	9.5	Spring Loaded Faucets	4.7	130	5				
		Handwash Lavatory	15	Spring Loaded Faucets	4.7	365	2				
ECO1 TOTAL:			LPM				37	0			
2	Misc. Sinks										
ECO2 TOTAL:			LPM				0	0			
3	Water Closets	Floor Mounted Flush Valve	17	Install 3.5 GPF Flush Valve	13.2	2200	19				
				Repair Kit							
		Tank Type (public)	11.4	Install 1.6 GPF Tank Type	6	1300	2				
ECO3 TOTAL:			LPM				21	0			
4	Urinals	Wall Mounted Flush Valve	5.68	Install 1.0 GPF Flush Valve	3.79	1300	7				
				Repair Kit							
ECO4 TOTAL:			LPM				7	0			
5	Shower Heads										
ECO5 TOTAL:			LPM				0	0			
6	Equipment Related										
ECO6 TOTAL:							0	0			

FY94S EEAP FT. KNOX WATER CONSERVATION STUDY

2 OF 2

CALCULATION WORK SHEET 2

FACILITY NO.: 1002
 Water Rate: 0.42 \$/KL Energy Rate: \$/KWH
 Gas Rate: 10.51 \$/MWH Demand Rate: \$/KW

ECO Number	Annual Water Saving	LPY	Annual Energy Saving			WATER		Total	Total
ECO Type			ELEC KW	ELEC KWH	GAS MWH	Dollar Saving	Dollar Saving	Dollar Saving	Dollars Invested
1	2,685,150				6	\$1,114.34	\$1,178.84	\$7,344.00	
Lavatory Sinks	233,025				1	\$96.71	\$102.30	\$1,224.00	
	502,605				1	\$208.58	\$220.66	\$489.60	
ECO1 TOTAL:	3,420,780		0	0	8	\$1,419.62	\$1,501.80	\$9,057.60	
2	0				0	\$0.00	\$0.00	\$0.00	
Misc. Sinks									
ECO2 TOTAL:	0		0	0	0	\$0.00	\$0.00	\$0.00	
3	158,840					\$65.92	\$65.92	\$1,140.91	
Water Closets	14,040					\$5.83	\$5.83	\$838.32	
ECO3 TOTAL:	172,880					\$71.75	\$71.75	\$1,979.23	
4	17,199					\$7.14	\$7.14	\$445.54	
Urinals									
ECO4 TOTAL:	17,199					\$7.14	\$7.14	\$445.54	
5	0				0	\$0.00	\$0.00	\$0.00	
Shower Heads									
ECO5 TOTAL:	0		0	0	0	\$0.00	\$0.00	\$0.00	
6									
Equipment Related									
ECO6 TOTAL:	0		0	0	0	\$0.00	\$0.00	\$0.00	

SYSTEMS CORP

Systems Engineering and Management Corporation, Knoxville, TN

FY94S EEAP FT. KNOX WATER CONSERVATION STUDY

1 2

DATE: 31 Oct 94

CALCULATION WORK SHEET 1

FACILITY NO.: 1017

FUNCTION: Training

Occupancy:

Operating Hours: 8

ECO Number ECO Type	Existing Fixture System		Retrofited Fixture System		Usage HRS/YR	Fixtures Quantity	Water Leaks Eliminated LPY
	Description	LPM	Description	LPM			
1 Lavatory Sinks	Public Lavatory	15	Spring Loaded Faucets	4.7	130	2	15800
ECO1 TOTAL:		LPM		LPM		2	15800
2 Misc. Sinks							
ECO2 TOTAL:		LPM		LPM		0	0
3 Water Closets	Floor Mounted Flush Valve	17	Install 3.5 GPF Flush Valve Repair Kit	13.2	10000	2	
ECO3 TOTAL:		LPM		LPM		2	0
4 Urinals							
ECO4 TOTAL:		LPM		LPM		0	0
5 Shower Heads							
ECO5 TOTAL:		LPM		LPM		0	0
6 Equipment Related							
ECO6 TOTAL:						0	0

SYSTEMS CORP

Systems Engineering and Management Corporation, Knoxville, TN

CALCULATION WORK SHEET 2

FACILITY NO.: 1017 Water Rate: 0.42 \$/KL Energy Rate: \$/KWH

Gas Rate: 10.51 \$/MWH Demand Rate: \$/KW

ECO Number	ECO Type	Annual Water		Annual Energy Saving			WATER		Total	
		Saving	LPY	ELEC KW	ELEC KWH	GAS MWH	Dollar Saving	Dollar Saving	Dollar Saving	Dollars Invested
1	Lavatory Sinks	194,810				0	\$80.85	\$85.53	\$489.60	
		0				0	\$0.00	\$0.00	\$0.00	
ECO1 TOTAL:		194,810		0	0	0	\$80.85	\$85.53	\$489.60	
2	Misc. Sinks	0				0	\$0.00	\$0.00	\$0.00	
ECO2 TOTAL:		0		0	0	0	\$0.00	\$0.00	\$0.00	
3	Water Closets	76,000					\$31.54	\$31.54	\$120.10	
ECO3 TOTAL:		76,000					\$31.54	\$31.54	\$120.10	
4	Urinals	0					\$0.00	\$0.00	\$0.00	
ECO4 TOTAL:		0					\$0.00	\$0.00	\$0.00	
5	Shower Heads	0				0	\$0.00	\$0.00	\$0.00	
ECO5 TOTAL:		0		0	0	0	\$0.00	\$0.00	\$0.00	
6	Equipment Related									
ECO6 TOTAL:		0		0	0	0	\$0.00	\$0.00	\$0.00	

SYSTEMS CORP

Systems Engineering and Management Corporation, Knoxville, TN

FY94S EEAP FT. KNOX WATER CONSERVATION STUDY

1 2

DATE: 29 Oct 94

CALCULATION WORK SHEET 1

FACILITY NO.: 1054

FUNCTION:

Maintenance

Occupancy:

Operating Hours:

8

ECO Number ECO Type	Existing Fixture System		Retrofited Fixture System		Usage HRS/YR	Fixtures Quantity	Water Leaks Eliminated LPY
	Description	LPM	Description	LPM			
1	Public Lavatory	9.5	Spring Loaded Faucets	4.7	730	5	
Lavatory Sinks							
ECO1 TOTAL:		LPM		LPM		5	0
2							0
Misc. Sinks							
ECO2 TOTAL:		LPM		LPM			
3	Floor Mounted Flush Valve	17	Install 3.5 GPF Flush Valve	13.2	3000	4	
Water Closets							
			Repair Kit				
ECO3 TOTAL:		LPM		LPM		4	0
4	Wall Mounted Flush Valve	5.68	Install 1.0 GPF Flush Valve	3.79	18250	2	
Urinals							
			Repair Kit				
ECO4 TOTAL:		LPM		LPM		2	0
5							0
Shower Heads							
ECO5 TOTAL:		LPM		LPM		0	0
6							
Equipment Related							
ECO6 TOTAL:						0	0

SYSTEMS CORP

Systems Engineering and Management Corporation, Knoxville, TN

CALCULATION WORK SHEET 2

FACILITY NO. : 1054 Water Rate: 0.42 \$/KL Energy Rate: \$/KWH

Gas Rate: 10.51 \$/MWH Demand Rate: \$/KW

ECO Number	ECO Type	Annual Water Saving LPY	Annual Energy Saving			WATER Dollar Saving	Total Dollar Saving	Total Dollars Invested
			ELEC KW	ELEC KWH	GAS MWH			
1	Lavatory Sinks	1,308,525			3	\$543.04	\$577.62	\$1,224.00
		0			0	\$0.00	\$0.00	\$0.00
		0			0	\$0.00	\$0.00	\$0.00
ECO1 TOTAL:		1,308,525	0	0	3	\$543.04	\$577.62	\$1,224.00
2	Misc. Sinks	0			0	\$0.00	\$0.00	\$0.00
		0			0	\$0.00	\$0.00	\$0.00
		0			0	\$0.00	\$0.00	\$0.00
ECO2 TOTAL:		0	0	0	0	\$0.00	\$0.00	\$0.00
3	Water Closets	45,600				\$18.92	\$18.92	\$240.19
		0				\$0.00	\$0.00	\$0.00
		0				\$0.00	\$0.00	\$0.00
ECO3 TOTAL:		45,600				\$18.92	\$18.92	\$240.19
4	Urinals	68,985				\$28.63	\$28.63	\$127.30
		0				\$0.00	\$0.00	\$0.00
		0				\$0.00	\$0.00	\$0.00
ECO4 TOTAL:		68,985				\$28.63	\$28.63	\$127.30
5	Shower Heads	0			0	\$0.00	\$0.00	\$0.00
		0			0	\$0.00	\$0.00	\$0.00
		0			0	\$0.00	\$0.00	\$0.00
ECO5 TOTAL:		0	0	0	0	\$0.00	\$0.00	\$0.00
6	Equipment Related	0			0	\$0.00	\$0.00	\$0.00
		0			0	\$0.00	\$0.00	\$0.00
		0			0	\$0.00	\$0.00	\$0.00
		0			0	\$0.00	\$0.00	\$0.00
ECO6 TOTAL:		0	0	0	0	\$0.00	\$0.00	\$0.00

SYSTEMS CORP

Systems Engineering and Management Corporation, Knoxville, TN

FY94S EEAP FT. KNOX WATER CONSERVATION STUDY

1 2

CALCULATION WORK SHEET 1

DATE: 29 Oct 94

FACILITY NO. : 1055

FUNCTION: Maintenance

Operating Hours: 8

ECO Number ECO Type	Existing Fixture System		Retrofited Fixture System		Usage HRS/YR	Fixtures Quantity	Water Leaks Eliminated LPY
	Description	LPM	Description	LPM			
1	Public Lavatory	9.5	Spring Loaded Faucets	4.7	730	2	
Lavatory Sinks							
ECO1 TOTAL:		LPM		LPM		2	0
2							0
Misc. Sinks							
ECO2 TOTAL:		LPM		LPM			
3	Floor Mounted Flush Valve	17	Install 3.5 GPF Flush Valve	13.2	18250	2	
Water Closets							
ECO3 TOTAL:		LPM		LPM		2	0
4							
Urinals							
ECO4 TOTAL:		LPM		LPM		0	0
5							0
Shower Heads							
ECO5 TOTAL:		LPM		LPM		0	0
6							
Equipment Related							
ECO6 TOTAL:						0	0

SYSTEMS CORP

Systems Engineering and Management Corporation, Knoxville, TN

FY94S EEAP FT. KNOX WATER CONSERVATION STUDY

2 OF 2

CALCULATION WORK SHEET 2

FACILITY NO.: 1055 Water Rate: 0.42 \$/KL Energy Rate: \$/KWH

Gas Rate: 10.51 \$/MWH Demand Rate: \$/KW

ECO Number	Annual Water Saving LPY	Annual Energy Saving			WATER		Total	Total
ECO Type		ELEC KW	ELEC KWH	GAS MWH	Dollar Saving	Dollar Saving	Dollar Saving	Dollars Invested
1	523,410			1	\$217.22	\$231.05	\$489.60	
Lavatory Sinks	0			0	\$0.00	\$0.00	\$0.00	\$0.00
	0			0	\$0.00	\$0.00	\$0.00	\$0.00
ECO1 TOTAL:	523,410	0	0	1	\$217.22	\$231.05	\$489.60	
2	0			0	\$0.00	\$0.00	\$0.00	\$0.00
Misc. Sinks	0			0	\$0.00	\$0.00	\$0.00	\$0.00
	0			0	\$0.00	\$0.00	\$0.00	\$0.00
ECO2 TOTAL:	0	0	0	0	\$0.00	\$0.00	\$0.00	\$0.00
3	138,700				\$57.56	\$57.56	\$120.10	
Water Closets	0				\$0.00	\$0.00	\$0.00	\$0.00
	0				\$0.00	\$0.00	\$0.00	\$0.00
ECO3 TOTAL:	138,700				\$57.56	\$57.56	\$120.10	
4	0				\$0.00	\$0.00	\$0.00	\$0.00
Urinals	0				\$0.00	\$0.00	\$0.00	\$0.00
	0				\$0.00	\$0.00	\$0.00	\$0.00
ECO4 TOTAL:	0				\$0.00	\$0.00	\$0.00	\$0.00
5	0			0	\$0.00	\$0.00	\$0.00	\$0.00
Shower Heads	0			0	\$0.00	\$0.00	\$0.00	\$0.00
	0			0	\$0.00	\$0.00	\$0.00	\$0.00
ECO5 TOTAL:	0	0	0	0	\$0.00	\$0.00	\$0.00	\$0.00
6	0			0	\$0.00	\$0.00	\$0.00	\$0.00
Equipment Related	0			0	\$0.00	\$0.00	\$0.00	\$0.00
	0			0	\$0.00	\$0.00	\$0.00	\$0.00
	0			0	\$0.00	\$0.00	\$0.00	\$0.00
ECO6 TOTAL:	0	0	0	0	\$0.00	\$0.00	\$0.00	\$0.00

SYSTEMS CORP

Systems Engineering and Management Corporation, Knoxville, TN

FY94S EEAP FT. KNOX WATER CONSERVATION STUDY

1 2

CALCULATION WORK SHEET 1

DATE: 31 Oct 94

FACILITY NO.: 1117

FUNCTION:

Distinguished Visitors

Quarters

10

Operating Hours:

24

Occupancy:

ECO Number ECO Type	Existing Fixture System		Retrofited Fixture System		Usage HRS/YR	Fixtures Quantity	Water Leaks Eliminated LPY
	Description	LPM	Description	LPM			
1	Public Lavatory	15	Spring Loaded Faucets	4.7	130	16	
Lavatory Sinks							
ECO1 TOTAL:		LPM		LPM		16	0
2							
Misc. Sinks							
ECO2 TOTAL:		LPM		LPM		0	0
3	Floor Mounted Flush Valve	17	Install 3.5 GPF Flush Valve	13.2	3600	14	
Water Closets							
			Repair Kit				
ECO3 TOTAL:		LPM		LPM		14	0
4	Wall Mounted Flush Valve	5.68	Install 1.0 GPF Flush Valve	3.79	1300	2	
Urinals							
			Repair Kit				
ECO4 TOTAL:		LPM		LPM		2	0
5							
Shower Heads							
ECO5 TOTAL:		LPM		LPM		0	0
6							
Equipment Related							
ECO6 TOTAL:						0	0

FY94S EEAP FT. KNOX WATER CONSERVATION STUDY

2 OF 2

CALCULATION WORK SHEET 2

\$/KWH

Energy Rate:

0.42 \$/KL

Water Rate:

\$/KW

Demand Rate:

10.51 \$/MWH

Gas Rate:

1117

ECO Number	Annual Water Saving LPY	Annual Energy Saving			WATER	Total	Total
ECO Type		ELEC KW	ELEC KWH	GAS MWH	Dollar Saving	Dollar Saving	Dollars Invested
1	1,432,080			3	\$594.31	\$628.72	\$3,916.80
Lavatory Sinks	0			0	\$0.00	\$0.00	\$0.00
ECO1 TOTAL:	1,432,080	0	0	3	\$594.31	\$628.72	\$3,916.80
2	0			0	\$0.00	\$0.00	\$0.00
Misc. Sinks							
ECO2 TOTAL:	0	0	0	0	\$0.00	\$0.00	\$0.00
3	191,520				\$79.48	\$79.48	\$840.67
Water Closets							
ECO3 TOTAL:	191,520				\$79.48	\$79.48	\$840.67
4	4,914				\$2.04	\$2.04	\$127.30
Urinals							
ECO4 TOTAL:	4,914				\$2.04	\$2.04	\$127.30
5	0			0	\$0.00	\$0.00	\$0.00
Shower Heads							
ECO5 TOTAL:	0	0	0	0	\$0.00	\$0.00	\$0.00
6							
Equipment Related							
ECO6 TOTAL:	0	0	0	0	\$0.00	\$0.00	\$0.00

SYSTEMS CORP

Systems Engineering and Management Corporation, Knoxville, TN

FY94S EEAP FT. KNOX WATER CONSERVATION STUDY

CALCULATION WORK SHEET 1

DATE:

FACILITY NO.: 1118

FUNCTION: Officers' Club/Dining

Occupancy: 3 Meals / Day

Operating Hours: 7:30 am to 2 am

ECO Number ECO Type	Existing Fixture System Description	LPM	Retrofitted Fixture System Description	LPM	Usage HRS/YR	Fixtures Quantity	Water Leaks Eliminated LPY
1 Lavatory Sinks	Dual Faucets	9.5	Spring Loaded Faucets	4.7	1095	23	
ECO1 TOTAL:		LPM		LPM		23	0
2 Misc. Sinks							
ECO2 TOTAL:		LPM		LPM		0	0
3 Water Closets	Floor Mounted Flush Valve	17	Install 3.5 GPF Flush Valve	13.2	10950	20	
			Repair Kit				
ECO3 TOTAL:		LPM		LPM		20	0
4 Urinals	Wall Mounted Flush Valve	5.68	Install 1.0 GPF Flush Valve	3.79	10950	9	
			Repair Kit				
ECO4 TOTAL:		LPM		LPM		9	0
5 Shower Heads							
ECO5 TOTAL:		LPM		LPM		0	0
6 Equipment Related	2 Comp. Sink (1 faucets)	9.5	Install Aerators	9.5	2190	1	
	1 Comp. Sink (1 faucets)	17	Install Aerators	9.5	2190	2	
ECO6 TOTAL:						3	0

CALCULATION WORK SHEET 2

FACILITY NO.: 1118 Water Rate: 0.42 \$/KL Energy Rate: \$/KWH

Gas Rate: 10.51 \$/MWH Demand Rate: \$/KW

ECO Number	Annual Water Saving LPY	Annual Energy Saving			WATER		Total	Total
ECO Type		ELEC KW	ELEC KWH	GAS MWH	Dollar Saving		Dollar Saving	Dollars Invested
1				14	\$3,746.96		\$3,893.37	\$5,385.60
Lavatory Sinks	9,028,823			0	\$0.00		\$0.00	\$0.00
	0			0	\$0.00		\$0.00	\$0.00
ECO1 TOTAL:	9,028,823	0	0	14	\$3,746.96		\$3,893.37	\$5,385.60
2				0	\$0.00		\$0.00	\$0.00
Misc. Sinks	0			0	\$0.00		\$0.00	\$0.00
	0			0	\$0.00		\$0.00	\$0.00
ECO2 TOTAL:	0	0	0	0	\$0.00		\$0.00	\$0.00
3					\$345.36		\$345.36	\$1,200.96
Water Closets	832,200				\$0.00		\$0.00	\$0.00
	0				\$0.00		\$0.00	\$0.00
ECO3 TOTAL:	832,200				\$345.36		\$345.36	\$1,200.96
4					\$77.30		\$77.30	\$572.83
Urinals	186,260				\$0.00		\$0.00	\$0.00
	0				\$0.00		\$0.00	\$0.00
ECO4 TOTAL:	186,260				\$77.30		\$77.30	\$572.83
5				0	\$0.00		\$0.00	\$0.00
Shower Heads	0			0	\$0.00		\$0.00	\$0.00
	0			0	\$0.00		\$0.00	\$0.00
ECO5 TOTAL:	0	0	0	0	\$0.00		\$0.00	\$0.00
6				0	\$0.00		\$0.00	\$0.00
Equipment Related	1,971,000			3	\$8.18		\$40.14	\$16.16
	0			0	\$0.00		\$0.00	\$0.00
	0			0	\$0.00		\$0.00	\$0.00
ECO6 TOTAL:	1,971,000	0	0	3	\$8.18		\$40.14	\$16.16

SYSTEMS CORP

Systems Engineering and Management Corporation, Knoxville, TN

FY94S EEAP FT. KNOX WATER CONSERVATION STUDY

1 2

CALCULATION WORK SHEET 1

DATE: 31 Oct 94

FACILITY NO. : 1131

FUNCTION: Red Cross

Occupancy: 15

Operating Hours: 8

ECO Number ECO Type	Existing Fixture System		Retrofitted Fixture System		Usage HRS/YR	Fixtures Quantity	Water Leaks Eliminated LPY
	Description	LPM	Description	LPM			
1 Lavatory Sinks	Public Lavatory	15	Spring Loaded Faucets	4.7	130	1	
	Public Lavatory	9.5	Spring Loaded Faucets	4.7	130	2	
ECO1 TOTAL:		LPM		LPM		3	0
2 Misc. Sinks							
ECO2 TOTAL:		LPM		LPM		0	0
3 Water Closets	Tank Type (public)	11.4	Install 1.6 GPF Tank Type	6	5475	3	
			Water Closet				
ECO3 TOTAL:		LPM		LPM		3	0
4 Urinals							
ECO4 TOTAL:		LPM		LPM		0	0
5 Shower Heads							
ECO5 TOTAL:		LPM		LPM		0	0
6 Equipment Related							
ECO6 TOTAL:						0	0

SYSTEMS CORP

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FY94S EEAP FT. KNOX WATER CONSERVATION STUDY 2 OF 2

CALCULATION WORK SHEET 2

FACILITY NO.: 1131 Water Rate: 0.42 \$/KL Energy Rate: \$/KWH

Gas Rate: 10.51 \$/MWH Demand Rate: \$/KW

ECO Number	Annual Water Saving LPY	Annual Energy Saving			WATER	Total	Total
ECO Type		ELEC KW	ELEC KWH	GAS MWH	Dollar Saving	Dollar Saving	Dollars Invested
1	89,505			0	\$37.14	\$39.29	\$244.80
Lavatory Sinks	93,210			0	\$38.68	\$40.92	\$489.60
ECO1 TOTAL:	182,715	0	0	0	\$75.83	\$80.22	\$734.40
2	0			0	\$0.00	\$0.00	\$0.00
Misc. Sinks							
ECO2 TOTAL:	0	0	0	0	\$0.00	\$0.00	\$0.00
3	88,695				\$36.81	\$36.81	\$1,257.48
Water Closets							
ECO3 TOTAL:	88,695				\$36.81	\$36.81	\$1,257.48
4	0				\$0.00	\$0.00	\$0.00
Urinals							
ECO4 TOTAL:	0				\$0.00	\$0.00	\$0.00
5	0			0	\$0.00	\$0.00	\$0.00
Shower Heads							
ECO5 TOTAL:	0	0	0	0	\$0.00	\$0.00	\$0.00
6							
Equipment Related							
ECO6 TOTAL:	0	0	0	0	\$0.00	\$0.00	\$0.00

SYSTEMS CORP

Systems Engineering and Management Corporation, Knoxville, TN

FY94S EEAP FT. KNOX WATER CONSERVATION STUDY										1	2
CALCULATION WORK SHEET 1										DATE:	31 Oct 94
FACILITY NO.:		1138		FUNCTION:		Pool					
Occupancy:		Varies		Operating Hours:		10					
ECO Number	ECO Type	Existing Fixture System	Description	LPM	Retrofitted Fixture System	Description	LPM	Usage HRS/YR	Fixtures Quantity	Water Leaks Eliminated LPY	
1	Lavatory Sinks	Public Lavatory		15	Spring Loaded Faucets and Mixing Valve		4.7	130	11		
ECO1 TOTAL:				LPM			LPM		11	0	
2	Misc. Sinks	Service Sink		45	Install Aerators		9.5	130	1		
ECO2 TOTAL:				LPM			LPM		1	0	
3	Water Closets	Floor Mounted Flush Valve		17	Install 3.5 GPF Flush Valve		13.2	2290	16		
ECO3 TOTAL:				LPM			LPM		16	0	
4	Urinals	Wall Mounted Flush Valve		5.68	Install 1.0 GPF Flush Valve		3.79	8000	7		
ECO4 TOTAL:				LPM			LPM		7	0	
5	Shower Heads										
ECO5 TOTAL:				LPM			LPM		0	0	
6	Equipment Related										
ECO6 TOTAL:									0	0	

CALCULATION WORK SHEET 2

FACILITY NO.: 1138 Water Rate: 0.42 \$/KL Energy Rate: \$/KWH

Gas Rate: 10.51 \$/MWH Demand Rate: \$/KW

ECO Number	ECO Type	Annual Water		Annual Energy Saving			WATER		Total		Total	
		Saving	LPY	ELEC KW	ELEC KWH	GAS MWH	Dollar Saving		Dollar Saving		Dollars Invested	
1	Lavatory Sinks	984,555				2	\$408.59		\$432.24		\$2,692.80	
ECO1 TOTAL:		984,555		0	0	2	\$408.59		\$432.24		\$2,692.80	
2	Misc. Sinks	276,900				1	\$1.15		\$7.80		\$9.70	
ECO2 TOTAL:		276,900		0	0	1	\$1.15		\$7.80		\$9.70	
3	Water Closets	139,232					\$57.78		\$57.78		\$960.77	
ECO3 TOTAL:		139,232		0	0	1	\$57.78		\$57.78		\$960.77	
4	Urinals	105,840					\$43.92		\$43.92		\$445.54	
ECO4 TOTAL:		105,840					\$43.92		\$43.92		\$445.54	
5	Shower Heads	0				0	\$0.00		\$0.00		\$0.00	
ECO5 TOTAL:		0		0	0	0	\$0.00		\$0.00		\$0.00	
6	Equipment Related											
ECO6 TOTAL:		0		0	0	0	\$0.00		\$0.00		\$0.00	

SYSTEMS CORP

Systems Engineering and Management Corporation, Knoxville, TN

FY94S EEAP FT. KNOX WATER CONSERVATION STUDY

1 2

CALCULATION WORK SHEET 1

DATE: 31 Oct 94

FACILITY NO.: 1173

FUNCTION: Post Chapel

Occupancy: 108 to 250

Operating Hours: 8

ECO Number ECO Type	Existing Fixture System		Retrofited Fixture System		Usage HRS/YR	Fixtures Quantity	Water Leaks Eliminated LPY
	Description	LPM	Description	LPM			
1 Lavatory Sinks	Public Lavatory	17	Spring Loaded Faucets	4.7	130	1	
	Public Lavatory	9.5	Spring Loaded Faucets	4.7	130	1	
ECO1 TOTAL:		LPM		LPM		2	0
2 Misc. Sinks							
ECO2 TOTAL:		LPF		LPF	#FL/YR	0	0
3 Water Closets	Tank Type (public)	11.4	Install 1.6 GPF Tank Type	6	4380	2	
			Water Closet				
ECO3 TOTAL:		LPF		LPF	#FL/YR	2	0
4 Urinals							
ECO4 TOTAL:		LPM		LPM	HRS/YR	0	0
5 Shower Heads							
ECO5 TOTAL:		LPM		LPM		0	0
6 Equipment Related							
ECO6 TOTAL:						0	0

SYSTEMS CORP

Systems Engineering and Management Corporation, Knoxville, TN

CALCULATION WORK SHEET 2

FACILITY NO.: 1173 Water Rate: 0.42 \$/KL Energy Rate: \$/KWH

Gas Rate: 10.51 \$/MWH Demand Rate: \$/KW

ECO Number	ECO Type	Annual Water		Annual Energy Saving			WATER		Total		Total	
		Saving	LPY	ELEC KW	ELEC KWH	GAS MWH	Dollar Saving		Dollar Saving		Dollars Invested	
1	Lavatory Sinks	105,105				0	\$43.62		\$46.14		\$244.80	
		46,605				0	\$19.34		\$20.46		\$244.80	
ECO1 TOTAL:		151,710		0	0	0	\$62.96		\$66.60		\$489.60	
2	Misc. Sinks	0				0	\$0.00		\$0.00		\$0.00	
ECO2 TOTAL:		0		0	0	0	\$0.00		\$0.00		\$0.00	
3	Water Closets	47,304					\$19.63		\$19.63		\$838.32	
ECO3 TOTAL:		47,304					\$19.63		\$19.63		\$838.32	
4	Urinals	0					\$0.00		\$0.00		\$0.00	
ECO4 TOTAL:		0					\$0.00		\$0.00		\$0.00	
5	Shower Heads	0				0	\$0.00		\$0.00		\$0.00	
ECO5 TOTAL:		0		0	0	0	\$0.00		\$0.00		\$0.00	
6	Equipment Related											
ECO6 TOTAL:		0		0	0	0	\$0.00		\$0.00		\$0.00	

SYSTEMS CORP

Systems Engineering and Management Corporation, Knoxville, TN

DATE: 31 Oct 94

CALCULATION WORK SHEET 1

Training Building

FUNCTION:

1174

FACILITY NO.:

8

Operating Hours:

100

Occupancy:

ECO Number ECO Type	Existing Fixture System		Retrofited Fixture System		Usage HRS/YR	Fixtures Quantity	Water Leaks Eliminated LPY
	Description	LPM	Description	LPM			
1 Lavatory Sinks	Public Lavatory	15	Spring Loaded Faucets	4.7	130	15	
ECO1 TOTAL:		LPM		LPM		15	0
2 Misc. Sinks	Service Sink	23	Install Aerators	9.5	130	3	
ECO2 TOTAL:		LPM		LPM			
3 Water Closets	Floor Mounted Flush Valve	17	Install 3.5 GPF Flush Valve Repair Kit	13.2	2200	21	
ECO3 TOTAL:		LPM		LPM		21	0
4 Urinals	Wall Mounted Flush Valve	5.68	Install 1.0 GPF Flush Valve Repair Kit	3.79	8580	9	
ECO4 TOTAL:		LPM		LPM		9	0
5 Shower Heads							
ECO5 TOTAL:		LPM		LPM		0	0
6 Equipment Related							
ECO6 TOTAL:						0	0

SYSTEMS CORP

Systems Engineering and Management Corporation, Knoxville, TN

CALCULATION WORK SHEET 2

FACILITY NO.: 1174 Water Rate: 0.42 \$/KL Energy Rate: \$/KWH

Gas Rate: 10.51 \$/MWH Demand Rate: \$/KW

ECO Number	ECO Type	Annual Water Saving LPY	Annual Energy Saving			WATER		Total Dollar Saving	Total Dollars Invested
			ELEC KW	ELEC KWH	GAS MWH				
1	Lavatory Sinks	1,342,575			3	\$557.17		\$589.42	\$3,672.00
		0			0	\$0.00		\$0.00	\$0.00
ECO1 TOTAL:		1,342,575	0	0	3	\$557.17	\$589.42	\$589.42	\$3,672.00
2	Misc. Sinks	315,900			1	\$1.31	\$8.90	\$8.90	\$29.09
ECO2 TOTAL:		315,900	0	0	1	\$1.31	\$8.90	\$8.90	\$29.09
3	Water Closets	175,560				\$72.86	\$72.86	\$72.86	\$1,261.01
ECO3 TOTAL:		175,560				\$72.86	\$72.86	\$72.86	\$1,261.01
4	Urinals	145,946				\$60.57	\$60.57	\$60.57	\$572.83
ECO4 TOTAL:		145,946				\$60.57	\$60.57	\$60.57	\$572.83
5	Shower Heads	0			0	\$0.00	\$0.00	\$0.00	\$0.00
ECO5 TOTAL:		0	0	0	0	\$0.00	\$0.00	\$0.00	\$0.00
6	Equipment Related								
ECO6 TOTAL:		0	0	0	0	\$0.00	\$0.00	\$0.00	\$0.00

SYSTEMS CORP

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FY94S EEAP FT. KNOX WATER CONSERVATION STUDY

1 2

CALCULATION WORK SHEET 1

DATE: 31 Oct 94

Chapel Annex

FUNCTION:

1176

FACILITY NO.:

Operating Hours:

25

Occupancy:

ECO Number ECO Type	Existing Fixture System		Retrofited Fixture System		Usage HRS/YR	Fixtures Quantity	Water Leaks Eliminated LPY
	Description	LPM	Description	LPM			
1 Lavatory Sinks	Public Lavatory	9.5	Spring Loaded Faucets	4.7	130	2	
ECO1 TOTAL:		LPM		LPM		2	0
2 Misc. Sinks							
ECO2 TOTAL:		LPF		LPF	#FL/YR	0	0
3 Water Closets	Floor Mounted Flush Valve	17	Install 3.5 GPF Flush Valve Repair Kit	13.2	1059	2	
ECO3 TOTAL:		LPF		LPF	#FL/YR	2	0
4 Urinals	Wall Mounted Flush Valve	5.68	Install 1.0 GPF Flush Valve Repair Kit	3.79	1059	1	
ECO4 TOTAL:		LPM		LPM	HRS/YR	1	0
5 Shower Heads							
ECO5 TOTAL:		LPM		LPM		0	0
6 Equipment Related							
ECO6 TOTAL:						0	0

FY94S EEAP FT. KNOX WATER CONSERVATION STUDY 2 OF 2

CALCULATION WORK SHEET 2

FACILITY NO.: 1176 Water Rate: 0.42 \$/KL Energy Rate: \$/KWH

Gas Rate: 10.51 \$/MWH Demand Rate: \$/KW

ECO Number	ECO Type	Annual Water		Annual Energy Saving			WATER		Total	
		Saving	LPY	ELEC KW	ELEC KWH	GAS MWH	Dollar Saving	Dollar Saving	Dollar Saving	Dollars Invested
1	Lavatory Sinks	93,210				0	\$38.68	\$40.92	\$489.60	
		0				0	\$0.00	\$0.00	\$0.00	
ECO1 TOTAL:		93,210		0	0	0	\$38.68	\$40.92	\$489.60	
2	Misc. Sinks	0				0	\$0.00	\$0.00	\$0.00	
ECO2 TOTAL:		0		0	0	0	\$0.00	\$0.00	\$0.00	
3	Water Closets	8,048					\$3.34	\$3.34	\$120.10	
ECO3 TOTAL:		8,048					\$3.34	\$3.34	\$120.10	
4	Urinals	2,002					\$0.83	\$0.83	\$63.65	
ECO4 TOTAL:		2,002					\$0.83	\$0.83	\$63.65	
5	Shower Heads	0				0	\$0.00	\$0.00	\$0.00	
ECO5 TOTAL:		0		0	0	0	\$0.00	\$0.00	\$0.00	
6	Equipment Related									
ECO6 TOTAL:		0		0	0	0	\$0.00	\$0.00	\$0.00	

SYSTEMS CORP

Systems Engineering and Management Corporation, Knoxville, TN

FY94S EEAP FT. KNOX WATER CONSERVATION STUDY										1	2
CALCULATION WORK SHEET 1										DATE:	
FACILITY NO. : 1308		FUNCTION: Pool									
Occupancy: Varies		Operating Hours: 8									
ECO Number	Existing Fixture System	Description	LPM	Retrofitted Fixture System	Description	LPM	Usage HRS/YR	Fixtures Quantity	Water Leaks Eliminated LPY		
1	Public Lavatory	Public Lavatory	17	Spring Loaded Faucets	Spring Loaded Faucets	4.7	130	2			
	Public Lavatory	Public Lavatory	9.5	Spring Loaded Faucets	Spring Loaded Faucets	4.7	130	2			
ECO1 TOTAL:			LPM			LPM		4	0		
2											
Misc. Sinks											
ECO2 TOTAL:			LPF			LPF	#FL/YR	0	0		
3	Tank Type (public)		11.4	Inst. 1.6 GPF Flush Tank		6	2200	3			
				Water Closets							
ECO3 TOTAL :			LPF			LPF	#FL/YR	3	0		
4	Wall Mounted Flush Valve		5.68	Install 1.0 GPF Flush Valve		3.79	2200	1			
	Urinals			Repair Kit							
ECO4 TOTAL :			LPM			LPM	HRS/YR	1	0		
5											
Shower Heads											
ECO5 TOTAL :			LPM			LPM		0	0		
6											
Equipment Related											
ECO6 TOTAL :								0	0		

CALCULATION WORK SHEET 2

FACILITY NO.: 1308 Water Rate: 0.42 \$/KL Energy Rate: \$/KWH

Gas Rate: 10.51 \$/MWH Demand Rate: \$/KW

ECO Number	ECO Type	Annual Water		Annual Energy Saving			WATER		Total	
		Saving	LPY	ELEC KW	ELEC KWH	GAS MWH	Dollar Saving	Dollar Saving	Dollar Saving	Dollars Invested
1	Lavatory Sinks	210,210				0	\$87.24	\$92.29	\$489.60	\$489.60
		93,210				0	\$38.68	\$40.92	\$489.60	\$489.60
ECO1 TOTAL:		303,420		0	0	1	\$125.92	\$133.21	\$979.20	\$979.20
2	Misc. Sinks	0				0	\$0.00	\$0.00	\$0.00	\$0.00
ECO2 TOTAL:		0		0	0	0	\$0.00	\$0.00	\$0.00	\$0.00
3	Water Closets	35,640					\$14.79	\$14.79	\$1,257.48	\$1,257.48
ECO3 TOTAL:		35,640					\$14.79	\$14.79	\$1,257.48	\$1,257.48
4	Urinals	4,158					\$1.73	\$1.73	\$63.65	\$63.65
ECO4 TOTAL:		4,158					\$1.73	\$1.73	\$63.65	\$63.65
5	Shower Heads	0				0	\$0.00	\$0.00	\$0.00	\$0.00
ECO5 TOTAL:		0		0	0	0	\$0.00	\$0.00	\$0.00	\$0.00
6	Equipment Related									
ECO6 TOTAL:		0		0	0	0	\$0.00	\$0.00	\$0.00	\$0.00

SYSTEMS CORP

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FY94S EEAP FT. KNOX WATER CONSERVATION STUDY										1	2
CALCULATION WORK SHEET 1										DATE:	31 Oct 94
FACILITY NO. :		1321		FUNCTION:		Latrine					
Occupancy:				Operating Hours:		8					
ECO Number	Existing Fixture System	Description	LPM	Retrofitted Fixture System	Description	LPM	Usage HRS/YR	Fixtures Quantity	Water Leaks Eliminated LPY		
1	Public Lavatory		17	Spring Loaded Faucets		4.7	130	3			
ECO1 TOTAL:			LPM			LPM		3	0		
2											
Misc. Sinks											
ECO2 TOTAL:			LPF			LPF	#FL/YR	0	0		
3	Floor Mounted Flush Valve		17	Install 3.5 GPF Flush Valve		13.2	2200	3			
Water Closets				Repair Kit							
ECO3 TOTAL :			LPF			LPF	#FL/YR	3	0		
4	Wall Mounted Flush Valve		5.68	Install 1.0 GPF Flush Valve		3.79	2200	1			
Urinals				Repair Kit							
ECO4 TOTAL :			LPM			LPM	HRS/YR	1	0		
5											
Shower Heads											
ECO5 TOTAL :			LPM			LPM		0	0		
6											
Equipment Related											
ECO6 TOTAL :								0	0		

SYSTEMS CORP

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FY94S EEAP FT. KNOX WATER CONSERVATION STUDY 2 OF 2

CALCULATION WORK SHEET 2

FACILITY NO.: 1321 Water Rate: 0.42 \$/KL Energy Rate: \$/KWH

Gas Rate: 10.51 \$/MWH Demand Rate: \$/KW

ECO Number	Annual Water Saving	LPY	Annual Energy Saving			WATER		Total	Total
ECO Type			ELEC KW	ELEC KWH	GAS MWH	Dollar Saving	Dollar Saving	Dollar Saving	Dollars Invested
1	315,315				1	\$130.86	\$138.43	\$138.43	\$734.40
Lavatory Sinks	0				0	\$0.00	\$0.00	\$0.00	\$0.00
ECO1 TOTAL:	315,315		0	0	1	\$130.86	\$138.43	\$138.43	\$734.40
2	0				0	\$0.00	\$0.00	\$0.00	\$0.00
Misc. Sinks									
ECO2 TOTAL:	0		0	0	0	\$0.00	\$0.00	\$0.00	\$0.00
3	25,080					\$10.41	\$10.41	\$10.41	\$180.14
Water Closets									
ECO3 TOTAL:	25,080					\$10.41	\$10.41	\$10.41	\$180.14
4	4,158					\$1.73	\$1.73	\$1.73	\$63.65
Urinals									
ECO4 TOTAL:	4,158					\$1.73	\$1.73	\$1.73	\$63.65
5	0				0	\$0.00	\$0.00	\$0.00	\$0.00
Shower Heads									
ECO5 TOTAL:	0		0	0	0	\$0.00	\$0.00	\$0.00	\$0.00
6									
Equipment Related									
ECO6 TOTAL:	0		0	0	0	\$0.00	\$0.00	\$0.00	\$0.00

SYSTEMS CORP

Systems Engineering and Management Corporation, Knoxville, TN

FY94S EEAP FT. KNOX WATER CONSERVATION STUDY										1	2
CALCULATION WORK SHEET 1										DATE:	31 Oct 94
FACILITY NO. :		1359		FUNCTION:		Post Office					
Occupancy:		25		Operating Hours:		8					
ECO Number	ECO Type	Existing Fixture System		Retrofited Fixture System		Usage	Fixtures	Water Leaks			
		Description	LPM	Description	LPM	HRS/YR	Quantity	Eliminated LPY			
1	Lavatory Sinks	Public Lavatory	17	Spring Loaded Faucets	4.7	130	4				
		Public Lavatory	9.5	Spring Loaded Faucets	4.7	130	1				
ECO1 TOTAL:			LPM		LPM		5	0			
2	Misc. Sinks	Service Sink	45	Install Aerators	9.5	130	2				
ECO2 TOTAL:			LPF		LPF	#FL/YR	2	0			
3	Water Closets	Floor Mounted Flush Valve	17	Install 3.5 GPF Flush Valve	13.2	1500	5				
				Repair Kit							
ECO3 TOTAL :			LPF		LPF	#FL/YR	5	0			
4	Urinals	Wall Mounted Flush Valve	5.68	Install 1.0 GPF Flush Valve	3.79	6240	3				
				Repair Kit							
ECO4 TOTAL :			LPM		LPM	HRS/YR	3	0			
5	Shower Heads										
ECO5 TOTAL :			LPM		LPM		0	0			
6	Equipment Related										
ECO6 TOTAL :							0	0			

CALCULATION WORK SHEET 2

FACILITY NO.: 1359
 Water Rate: 0.42 \$/KL Energy Rate: \$/KWH
 Gas Rate: 10.51 \$/MWH Demand Rate: \$/KW

ECO Number	Annual Water Saving LPY	Annual Energy Saving			WATER		Total	Total
ECO Type		ELEC KW	ELEC KWH	GAS MWH	Dollar Saving	Dollar Saving	Dollar Saving	Dollars Invested
1 Lavatory Sinks	420,420 46,605			1 0	\$174.47 \$19.34	\$184.57 \$20.46	\$979.20 \$244.80	
ECO1 TOTAL:	467,025	0	0	1	\$193.82	\$205.04	\$1,224.00	
2 Misc. Sinks	553,800			1	\$2.30	\$15.60	\$19.39	
ECO2 TOTAL:	553,800	0	0	1	\$2.30	\$15.60	\$19.39	
3 Water Closets	28,500				\$11.83	\$11.83	\$300.24	
ECO3 TOTAL:	28,500				\$11.83	\$11.83	\$300.24	
4 Urinals	35,381				\$14.68	\$14.68	\$190.94	
ECO4 TOTAL:	35,381				\$14.68	\$14.68	\$190.94	
5 Shower Heads	0			0	\$0.00	\$0.00	\$0.00	
ECO5 TOTAL:	0	0	0	0	\$0.00	\$0.00	\$0.00	
6 Equipment Related								
ECO6 TOTAL:	0	0	0	0	\$0.00	\$0.00	\$0.00	

SYSTEMS CORP

Systems Engineering and Management Corporation, Knoxville, TN

FY94S EEAP FT. KNOX WATER CONSERVATION STUDY										1	2
CALCULATION WORK SHEET 1										DATE:	31 Oct 94
FACILITY NO.:		1392		FUNCTION:		Officers Quarters					
Occupancy:		20		Operating Hours:		Transient		24			
ECO Number	ECO Type	Existing Fixture System		Retrofited Fixture System		Usage	Fixtures	Water Leaks			
		Description	LPM	Description	LPM	HRS/YR	Quantity	Eliminated LPY			
1	Lavatory Sinks	Public Lavatory	9.5	Spring Loaded Faucets	4.7	130	16				
ECO1 TOTAL:			LPM		LPM		16	0			
2	Misc. Sinks										
ECO2 TOTAL:			LPM		LPM		0	0			
3	Water Closets	Floor Mounted Flush Valve	17	Install 3.5 GPF Flush Valve	13.2	1825	15				
ECO3 TOTAL:			LPM		LPM		15	0			
4	Urinals										
ECO4 TOTAL:			LPM		LPM		0	0			
5	Shower Heads										
ECO5 TOTAL:			LPM		LPM		0	0			
6	Equipment Related										
ECO6 TOTAL:							0	0			

SYSTEMS CORP

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CALCULATION WORK SHEET 2

FACILITY NO.: 1392 Water Rate: 0.42 \$/KL Energy Rate: \$/KWH

Gas Rate: 10.51 \$/MWH Demand Rate: \$/KW

ECO Number	Annual Water Saving LPY	Annual Energy Saving			WATER		Total	Total
ECO Type		ELEC KW	ELEC KWH	GAS MWH	Dollar Saving	Dollar Saving	Dollar Saving	Dollars Invested
1	745,680			2	\$309.46	\$327.37	\$3,916.80	
Lavatory Sinks	0			0	\$0.00	\$0.00	\$0.00	
ECO1 TOTAL:	745,680	0	0	2	\$309.46	\$327.37	\$3,916.80	
2	0			0	\$0.00	\$0.00	\$0.00	
Misc. Sinks								
ECO2 TOTAL:	0	0	0	0	\$0.00	\$0.00	\$0.00	
3	104,025				\$43.17	\$43.17	\$900.72	
Water Closets								
ECO3 TOTAL:	104,025				\$43.17	\$43.17	\$900.72	
4	0				\$0.00	\$0.00	\$0.00	
Urinals								
ECO4 TOTAL:	0				\$0.00	\$0.00	\$0.00	
5	0			0	\$0.00	\$0.00	\$0.00	
Shower Heads								
ECO5 TOTAL:	0	0	0	0	\$0.00	\$0.00	\$0.00	
6								
Equipment Related								
ECO6 TOTAL:	0	0	0	0	\$0.00	\$0.00	\$0.00	

SYSTEMS CORP

Systems Engineering and Management Corporation, Knoxville, TN

FY94S EEAP FT. KNOX V. TER CONSERVATION STUDY										JF 2	
CALCULATION WORK SHEET 1										DATE: 31 Oct 94	
FACILITY NO. : 1393		FUNCTION: Officers Quarters		Transient		Operating Hours: 24					
Occupancy: 15											
ECO Number	ECO Type	Existing Fixture System	LPM	Retrofited Fixture System	Description	LPM	Usage HRS/YR	Fixtures Quantity	Water Leaks Eliminated LPY		
1	Lavatory Sinks	Public Lavatory	9.5	Spring Loaded Faucets		4.7	130	16			
ECO1 TOTAL:			LPM			LPM		16	0		
2	Misc. Sinks										
ECO2 TOTAL:			LPM			LPM	#FLYR	0	0		
3	Water Closets	Floor Mounted Flush Valve	17	Install 3.5 GPF Flush Valve		13.2	1825	16			
ECO3 TOTAL:			LPM		Repair Kit						
4	Urinals										
ECO4 TOTAL:			LPM			LPM	HRS/YR	0	0		
5	Shower Heads										
ECO5 TOTAL:			LPM			LPM		0	0		
6	Equipment Related										
ECO6 TOTAL:								0	0		

SYSTEMS CORP

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CALCULATION WORK SHEET 2

FACILITY NO.: 1393 Water Rate: 0.42 \$/KL Energy Rate: \$/KWH

Gas Rate: 10.51 \$/MWH Demand Rate: \$/KW

ECO Number	Annual Water Saving LPY	Annual Energy Saving			WATER		Total	Total
ECO Type		ELEC KW	ELEC KWH	GAS MWH	Dollar Saving	Dollar Saving	Dollar Saving	Dollars Invested
1				2	\$309.46	\$327.37	\$3,916.80	
Lavatory Sinks	745,680			0	\$0.00	\$0.00	\$0.00	\$0.00
ECO1 TOTAL:	745,680	0	0	2	\$309.46	\$327.37	\$3,916.80	
2				0	\$0.00	\$0.00	\$0.00	
Misc. Sinks								
ECO2 TOTAL:	0	0	0	0	\$0.00	\$0.00	\$0.00	\$0.00
3					\$46.05	\$46.05	\$960.77	
Water Closets	110,960							
ECO3 TOTAL:	110,960				\$46.05	\$46.05	\$960.77	
4					\$0.00	\$0.00	\$0.00	
Urinals	0							
ECO4 TOTAL:	0				\$0.00	\$0.00	\$0.00	\$0.00
5				0	\$0.00	\$0.00	\$0.00	
Shower Heads	0							
ECO5 TOTAL:	0	0	0	0	\$0.00	\$0.00	\$0.00	\$0.00
6								
Equipment Related								
ECO6 TOTAL:	0	0	0	0	\$0.00	\$0.00	\$0.00	\$0.00

SYSTEMS CORP

Systems Engineering and Management Corporation, Knoxville, TN

FY94S EEAP FT. KNOX WATER CONSERVATION STUDY

1 2

DATE: 31 Oct 94

CALCULATION WORK SHEET 1

Enlisted Barracks

FUNCTION:

1467

FACILITY NO.:

15

Operating Hours:

200

Occupancy:

ECO Number ECO Type	Existing Fixture System		Retrofited Fixture System		Usage HRS/YR	Fixtures Quantity	Water Leaks Eliminated LPY
	Description	LPM	Description	LPM			
1	Public Lavatory	9.5	Spring Loaded Faucets	4.7	730	24	
Lavatory Sinks							
ECO1 TOTAL:		LPM		LPM		24	0
2	Laundry Sink	23	Install Aerators	9.5	2080	8	
Misc. Sinks							
ECO2 TOTAL:		LPM		LPM		8	0
3	Floor Mounted Flush Valve	17	Install 3.5 GPF Flush Valve	13.2	11526	38	
Water Closets							
ECO3 TOTAL:		LPM		LPM		38	0
4	Wall Mounted Flush Valve	5.68	Install 1.0 GPF Flush Valve	3.79	25000	2	
Urinals							
ECO4 TOTAL:		LPM		LPM		2	0
5							
Shower Heads							
ECO5 TOTAL:		LPM		LPM		0	0
6							
Equipment Related							
ECO6 TOTAL:						0	0

SYSTEMS CORP

Systems Engineering and Management Corporation, Knoxville, TN

CALCULATION WORK SHEET 2

FACILITY NO.: 1467 Water Rate: 0.42 \$/KL Energy Rate: \$/KWH

Gas Rate: 10.51 \$/MWH Demand Rate: \$/KW

ECO Number	Annual Water Saving LPY	Annual Energy Saving			WATER		Total	Total
ECO Type		ELEC KW	ELEC KWH	GAS MWH	Dollar Saving	Dollar Saving	Dollar Saving	Dollars Invested
1 Lavatory Sinks	6,280,920 0			14 0	\$2,606.58 \$0.00	\$2,757.47 \$0.00	\$5,875.20 \$0.00	
ECO1 TOTAL:	6,280,920	0	0	14	\$2,606.58	\$2,757.47	\$5,875.20	
2 Misc. Sinks	13,478,400			31	\$55.94	\$379.74	\$77.57	
ECO2 TOTAL:	13,478,400	0	0	31	\$55.94	\$379.74	\$77.57	
3 Water Closets	1,664,354				\$690.71	\$690.71	\$2,281.82	
ECO3 TOTAL:	1,664,354				\$690.71	\$690.71	\$2,281.82	
4 Urinals	94,500				\$39.22	\$39.22	\$127.30	
ECO4 TOTAL:	94,500				\$39.22	\$39.22	\$127.30	
5 Shower Heads	0			0	\$0.00	\$0.00	\$0.00	
ECO5 TOTAL:	0	0	0	0	\$0.00	\$0.00	\$0.00	
6 Equipment Related								
ECO6 TOTAL:	0	0	0	0	\$0.00	\$0.00	\$0.00	

SYSTEMS CORP

Systems Engineering and Management Corporation, Knoxville, TN

FY94S EEAP FT. KNOX WATER CONSERVATION STUDY										1042
CALCULATION WORK SHEET 1										DATE: 31 Oct 94
FACILITY NO.:		1468		FUNCTION:		Enlisted Barracks				
Occupancy:		120		Operating Hours:		24				
ECO Number ECO Type	Existing Fixture System		Retrofited Fixture System		Usage HRS/YR	Fixtures Quantity	Water Leaks Eliminated LPY			
	Description	LPM	Description	LPM						
1 Lavatory Sinks	Public Lavatory	9.5	Spring Loaded Faucets	4.7	730	16				
ECO1 TOTAL:		LPM		LPM		16	0			
2 Misc. Sinks	Laundry Sink	32	Install Aerators	9.5	2080	8				
ECO2 TOTAL:		LPM		LPM		8	0			
3 Water Closets	Floor Mounted Flush Valve	17	Install 3.5 GPF Flush Valve	13.2	8000	16				
			Repair Kit							
ECO3 TOTAL:		LPM		LPM		16	0			
4 Urinals	Wall Mounted Flush Valve	5.68	Install 1.0 GPF Flush Valve	3.79	20000	9				
			Repair Kit							
ECO4 TOTAL:		LPM		LPM		9	0			
5 Shower Heads										
ECO5 TOTAL:		LPM		LPM		0	0			
6 Equipment Related										
ECO6 TOTAL:						0	0			

SYSTEMS CORP

Systems Engineering and Management Corporation, Knoxville, TN

CALCULATION WORK SHEET 2

FACILITY NO.: 1468 Water Rate: 0.42 \$/KL Energy Rate: \$/KWH

Gas Rate: 10.51 \$/MWH Demand Rate: \$/KW

ECO Number	ECO Type	Annual Water		Annual Energy Saving			WATER		Total	
		Saving	LPY	ELEC KW	ELEC KWH	GAS MWH	Dollar Saving	Dollar Saving	Dollar Saving	Dollars Invested
1	Lavatory Sinks	4,187,280				10	\$1,737.72	\$1,838.32	\$3,916.80	
		0				0	\$0.00	\$0.00	\$0.00	
ECO1 TOTAL:		4,187,280		0	0	10	\$1,737.72	\$1,838.32	\$3,916.80	
2	Misc. Sinks	22,464,000				51	\$93.23	\$632.90	\$77.57	
ECO2 TOTAL:		22,464,000		0	0	51	\$93.23	\$632.90	\$77.57	
3	Water Closets	486,400					\$201.86	\$201.86	\$960.77	
ECO3 TOTAL:		486,400					\$201.86	\$201.86	\$960.77	
4	Urinals	340,200					\$141.18	\$141.18	\$572.83	
ECO4 TOTAL:		340,200					\$141.18	\$141.18	\$572.83	
5	Shower Heads	0				0	\$0.00	\$0.00	\$0.00	
ECO5 TOTAL:		0		0	0	0	\$0.00	\$0.00	\$0.00	
6	Equipment Related									
ECO6 TOTAL:		0		0	0	0	\$0.00	\$0.00	\$0.00	

SYSTEMS CORP

Systems Engineering and Management Corporation, Knoxville, TN

FY94S EEAP FT. KNOX WATER CONSERVATION STUDY

1

CALCULATION WORK SHEET 1

DATE: 31 Oct 94

FACILITY NO.: 1487

FUNCTION: Training Building

Occupancy:

Operating Hours: 9

ECO Number ECO Type	Existing Fixture System		Retrofited Fixture System		Usage HRS/YR	Fixtures Quantity	Water Leaks Eliminated LPY
	Description	LPM	Description	LPM			
1	Public Lavatory	17	Spring Loaded Faucets	4.7	130	3	
Lavatory Sinks							
ECO1 TOTAL:		LPM		LPM		3	0
2	Service Sink	17	Install Aerators	9.5	130	1	
Misc. Sinks							
ECO2 TOTAL:		LPF		LPF	#FL/YR	1	0
3	Floor Mounted Flush Valve	17	Install 3.5 GPF Flush Valve	13.2	2200	3	
Water Closets							
			Repair Kit				
ECO3 TOTAL:		LPF		LPF	#FL/YR	3	0
4	Wall Mounted Flush Valve	5.68	Install 1.0 GPF Flush Valve	3.79	8580	2	
Urinals							
			Repair Kit				
ECO4 TOTAL:		LPM		LPM	HRS/YR	2	0
5							
Shower Heads							
ECO5 TOTAL:		LPM		LPM		0	0
6							
Equipment Related							
ECO6 TOTAL:						0	0

SYSTEMS CORP

Systems Engineering and Management Corporation, Knoxville, TN

CALCULATION WORK SHEET 2

FACILITY NO.: 1487 Water Rate: 0.42 \$/KL Energy Rate: \$/KWH

Gas Rate: 10.51 \$/MWH Demand Rate: \$/KW

ECO Number	ECO Type	Annual Water		Annual Energy Saving			WATER		Total	
		Saving	LPY	ELEC KW	ELEC KWH	GAS MWH	Dollar Saving	Dollar Saving	Dollar Saving	Dollars Invested
1	Lavatory Sinks	315,315				0	\$130.86	\$130.86	\$130.86	\$734.40
		0				0	\$0.00	\$0.00	\$0.00	\$0.00
ECO1 TOTAL:		315,315		0	0	0	\$130.86	\$130.86	\$130.86	\$734.40
2	Misc. Sinks	58,500				0	\$0.24	\$0.24	\$1.65	\$9.70
ECO2 TOTAL:		58,500		0	0	0	\$0.24	\$0.24	\$1.65	\$9.70
3	Water Closets	25,080					\$10.41	\$10.41	\$10.41	\$180.14
ECO3 TOTAL:		25,080					\$10.41	\$10.41	\$10.41	\$180.14
4	Urinals	32,432					\$13.46	\$13.46	\$13.46	\$127.30
ECO4 TOTAL:		32,432					\$13.46	\$13.46	\$13.46	\$127.30
5	Shower Heads	0				0	\$0.00	\$0.00	\$0.00	\$0.00
ECO5 TOTAL:		0		0	0	0	\$0.00	\$0.00	\$0.00	\$0.00
6	Equipment Related									
ECO6 TOTAL:		0		0	0	0	\$0.00	\$0.00	\$0.00	\$0.00

SYSTEMS CORP

Systems Engineering and Management Corporation, Knoxville, TN

FY94S EEAP FT. KNOX WATER CONSERVATION STUDY

1042

CALCULATION WORK SHEET 1

DATE: 29 Oct 94

FACILITY NO.: 1531

FUNCTION: Maintenance

Occupancy:

8

Operating Hours:

ECO Number ECO Type	Existing Fixture System		Retrofited Fixture System		Usage HRS/YR	Fixtures Quantity	Water Leaks Eliminated LPY
	Description	LPM	Description	LPM			
1 Lavatory Sinks	Public Lavatory	9.5	Spring Loaded Faucets	4.7	730	2	
	Tub Type Lavatory	22.7	Spring Loaded Faucets	4.7	730	1	
ECO1 TOTAL:		LPM		LPM		3	0
2 Misc. Sinks							0
ECO2 TOTAL:							
3 Water Closets	Floor Mounted Flush Valve	17	Install 3.5 GPF Flush Valve	13.2	18250	2	0
			Repair Kit				
ECO3 TOTAL:		LPM		LPM	#FL/YR	2	0
4 Urinals							
ECO4 TOTAL:		LPM		LPM	HRS/YR	0	0
5 Shower Heads							0
ECO5 TOTAL:		LPM		LPM		0	0
6 Equipment Related							
ECO6 TOTAL:						0	0

SYSTEMS CORP

Systems Engineering and Management Corporation, Knoxville, TN

FY94S EEAP FT. KNOX WATER CONSERVATION STUDY 2 OF 2

CALCULATION WORK SHEET 2

FACILITY NO.: 1531
 Water Rate: 0.42 \$/KL Energy Rate: \$/KWH
 Gas Rate: 10.51 \$/MWH Demand Rate: \$/KW

ECO Number	Annual Water Saving LPY	Annual Energy Saving			WATER		Total	Total
ECO Type	Saving LPY	ELEC KW	ELEC KWH	GAS MWH	Dollar Saving	Dollar Saving	Dollar Saving	Dollars Invested
1	523,410			1	\$217.22	\$231.05	\$231.05	\$489.60
Lavatory Sinks	839,865			2	\$348.54	\$368.72	\$368.72	\$244.80
	0			0	\$0.00	\$0.00	\$0.00	\$0.00
ECO1 TOTAL:	1,363,275	0	0	3	\$565.76	\$599.77	\$599.77	\$734.40
2	0			0	\$0.00	\$0.00	\$0.00	\$0.00
Misc. Sinks	0			0	\$0.00	\$0.00	\$0.00	\$0.00
	0			0	\$0.00	\$0.00	\$0.00	\$0.00
ECO2 TOTAL:	0	0	0	0	\$0.00	\$0.00	\$0.00	\$0.00
3	138,700				\$57.56	\$57.56	\$57.56	\$120.10
Water Closets	0				\$0.00	\$0.00	\$0.00	\$0.00
	0				\$0.00	\$0.00	\$0.00	\$0.00
ECO3 TOTAL:	138,700				\$57.56	\$57.56	\$57.56	\$120.10
4	0				\$0.00	\$0.00	\$0.00	\$0.00
Urinals	0				\$0.00	\$0.00	\$0.00	\$0.00
	0				\$0.00	\$0.00	\$0.00	\$0.00
ECO4 TOTAL:	0				\$0.00	\$0.00	\$0.00	\$0.00
5	0			0	\$0.00	\$0.00	\$0.00	\$0.00
Shower Heads	0			0	\$0.00	\$0.00	\$0.00	\$0.00
	0			0	\$0.00	\$0.00	\$0.00	\$0.00
ECO5 TOTAL:	0	0	0	0	\$0.00	\$0.00	\$0.00	\$0.00
6	0			0	\$0.00	\$0.00	\$0.00	\$0.00
Equipment Related	0			0	\$0.00	\$0.00	\$0.00	\$0.00
	0			0	\$0.00	\$0.00	\$0.00	\$0.00
	0			0	\$0.00	\$0.00	\$0.00	\$0.00
ECO6 TOTAL:	0	0	0	0	\$0.00	\$0.00	\$0.00	\$0.00

SYSTEMS CORP

Systems Engineering and Management Corporation, Knoxville, TN

FY94S EEAP FT. KNOX WATER CONSERVATION STUDY

1002

CALCULATION WORK SHEET 1

DATE: 31 Oct 94

FACILITY NO.: 1532

FUNCTION: Training Building

Occupancy: 2

Operating Hours: 8

ECO Number ECO Type	Existing Fixture System Description	LPM	Retrofitted Fixture System Description	LPM	Usage HRS/YR	Fixtures Quantity	Water Leaks Eliminated LPY
1 Lavatory Sinks	Public Lavatory	9.5	Spring Loaded Faucets	4.7	130	2	
ECO1 TOTAL:		LPM		LPM		2	0
2 Misc. Sinks							
ECO2 TOTAL:		LPF		LPF	#FL/YR	0	0
3 Water Closets	Tank Type (public)	11.4	Install 1.6 GPF Tank Type Water Closet	6	1300	1	
ECO3 TOTAL:		LPF		LPF	#FL/YR	1	0
4 Urinals	Wall Mounted Flush Valve	5.68	Install 1.0 GPF Flush Valve Repair Kit	3.79	1300	2	
ECO4 TOTAL:		LPM		LPM	HRS/YR	2	0
5 Shower Heads							
ECO5 TOTAL:		LPM		LPM		0	0
6 Equipment Related							
ECO6 TOTAL:						0	0

SYSTEMS CORP

Systems Engineering and Management Corporation, Knoxville, TN

FY94S EEAP FT. KNOX WATER CONSERVATION STUDY 2 OF 2

CALCULATION WORK SHEET 2

FACILITY NO.: 1532 Water Rate: 0.42 \$/KL Energy Rate: \$/KWH

Gas Rate: 10.51 \$/MWH Demand Rate: \$/KW

ECO Number	ECO Type	Annual Water		Annual Energy Saving			WATER		Total		Total	
		Saving	LPY	ELEC KW	ELEC KWH	GAS MWH	Dollar Saving		Dollar Saving		Dollars Invested	
1	Lavatory Sinks	93,210				0	\$38.68		\$40.92		\$489.60	
		0				0	\$0.00		\$0.00		\$0.00	
ECO1 TOTAL:		93,210		0	0	0	\$38.68		\$40.92		\$489.60	
2	Misc. Sinks					0	\$0.00		\$0.00		\$0.00	
ECO2 TOTAL:		0		0	0	0	\$0.00		\$0.00		\$0.00	
3	Water Closets	7,020					\$2.91		\$2.91		\$419.16	
ECO3 TOTAL:		7,020					\$2.91		\$2.91		\$419.16	
4	Urinals	4,914					\$2.04		\$2.04		\$127.30	
ECO4 TOTAL:		4,914					\$2.04		\$2.04		\$127.30	
5	Shower Heads	0				0	\$0.00		\$0.00		\$0.00	
ECO5 TOTAL:		0		0	0	0	\$0.00		\$0.00		\$0.00	
6	Equipment Related											
ECO6 TOTAL:		0		0	0	0	\$0.00		\$0.00		\$0.00	

SYSTEMS CORP

Systems Engineering and Management Corporation, Knoxville, TN

FY94S EEAP FT. KNOX WATER CONSERVATION STUDY

100

CALCULATION WORK SHEET 1

DATE: 31 Oct 94

FACILITY NO.: 1541

FUNCTION: Training Building

Occupancy: 3

Operating Hours: 8

ECO Number ECO Type	Existing Fixture System		Retrofited Fixture System		Usage HRS/YR	Fixtures Quantity	Water Leaks Eliminated LPY
	Description	LPM	Description	LPM			
1 Lavatory Sinks	Public Lavatory	34	Spring Loaded Faucets	4.7	130	4	
ECO1 TOTAL:		LPM		LPM		4	0
2 Misc. Sinks							
ECO2 TOTAL:		LPF		LPF	#FL/YR	0	0
3 Water Closets	Floor Mounted Flush Valve	17	Install 3.5 GPF Flush Valve	13.2	1300	2	
			Repair Kit				
ECO3 TOTAL:		LPF		LPF	#FL/YR	2	0
4 Urinals	Wall Mounted Flush Valve	5.68	Install 1.0 GPF Flush Valve	3.79	1300	2	
			Repair Kit				
ECO4 TOTAL:		LPM		LPM	HRS/YR	2	0
5 Shower Heads							
ECO5 TOTAL:		LPM		LPM		0	0
6 Equipment Related							
ECO6 TOTAL:						0	0

SYSTEMS CORP

Systems Engineering and Management Corporation, Knoxville, TN

CALCULATION WORK SHEET 2

FACILITY NO. : 1541
 Water Rate: 0.42 \$/KL Energy Rate: \$/KWH
 Gas Rate: 10.51 \$/MWH Demand Rate: \$/KW

ECO Number	Annual Water Saving LPY	Annual Energy Saving			WATER		Total	Total
ECO Type		ELEC KW	ELEC KWH	GAS MWH	Dollar Saving	Dollar Saving	Dollars Invested	
1 Lavatory Sinks	950,820 0			2 0	\$394.59 \$0.00	\$417.43 \$0.00	\$979.20 \$0.00	
ECO1 TOTAL:	950,820 0	0	0	2 0	\$394.59 \$0.00	\$417.43 \$0.00	\$979.20 \$0.00	
2 Misc. Sinks								
ECO2 TOTAL:	0 9,880	0	0	0	\$0.00 \$4.10	\$0.00 \$4.10	\$0.00 \$120.10	
3 Water Closets								
ECO3 TOTAL:	9,880 4,914				\$4.10 \$2.04	\$4.10 \$2.04	\$120.10 \$127.30	
4 Urinals								
ECO4 TOTAL:	4,914 0				\$2.04 \$0.00	\$2.04 \$0.00	\$127.30 \$0.00	
5 Shower Heads								
ECO5 TOTAL:	0	0	0	0	\$0.00	\$0.00	\$0.00	
6 Equipment Related								
ECO6 TOTAL:	0	0	0	0	\$0.00	\$0.00	\$0.00	

SYSTEMS CORP

Systems Engineering and Management Corporation, Knoxville, TN

FY94S EEAP FT. KNOX WATER CONSERVATION STUDY										1 OF 2
CALCULATION WORK SHEET 1										DATE: 31 Oct 94
FACILITY NO. : 1609		FUNCTION: Fire Station								
Occupancy: 7		Operating Hours: 24								
ECO Number	Existing Fixture System	Retrofitted Fixture System		Usage	Fixtures	Water Leaks				
ECO Type	Description	LPM	Description	HRS/YR	Quantity	Eliminated LPY				
1	Private Lavatory	15	Spring Loaded Faucets	4.7	200	4				
Lavatory Sinks										
ECO1 TOTAL:		LPM		LPM	4	0				
2	Service Sink	15	Install Aerators	9.5	130	1				
Misc. Sinks										
ECO2 TOTAL:		LPM		LPM	1	0				
3	Floor Mounted Flush Valve	17	Install 3.5 GPF Flush Valve	13.2	1300	3				
Water Closets										
	Tank Type (public)	11.4	Install 1.6 GPF Tank Type	6	365	1				
ECO3 TOTAL:		LPM		LPM	4	0				
4	Wall Mounted Flush Valve	5.68	Install 1.0 GPF Flush Valve	3.79	2200	2				
Urinals										
ECO4 TOTAL:		LPM		LPM	2	0				
5	Shower Heads									
ECO5 TOTAL:		LPM		LPM	0	0				
6	Equipment Related									
ECO6 TOTAL:					0	0				

FY94S EEAP FT. KNOX WATER CONSERVATION STUDY 2 OF 2

CALCULATION WORK SHEET 2

FACILITY NO.: 1609 Water Rate: 0.42 \$/KL Energy Rate: \$/KWH

Gas Rate: 10.51 \$/MWH Demand Rate: \$/KW

ECO Number	Annual Water Saving	LPY	Annual Energy Saving			WATER		Total	Total
ECO Type			ELEC KW	ELEC KWH	GAS MWH	Dollar Saving	Dollar Saving	Dollar Saving	Dollars Invested
1	550,800				1	\$228.58	\$241.81	\$979.20	
Lavatory Sinks	0				0	\$0.00	\$0.00	\$0.00	
ECO1 TOTAL:	550,800		0	0	1	\$228.58	\$241.81	\$979.20	
2	42,900				0	\$0.18	\$1.21	\$9.70	
Misc. Sinks									
ECO2 TOTAL:	42,900		0	0	0	\$0.18	\$1.21	\$9.70	
3	14,820					\$6.15	\$6.15	\$180.14	
Water Closets	1,971					\$0.82	\$0.82	\$419.16	
ECO3 TOTAL:	16,791					\$6.97	\$6.97	\$599.30	
4	8,316					\$3.45	\$3.45	\$127.30	
Urinals									
ECO4 TOTAL:	8,316					\$3.45	\$3.45	\$127.30	
5	0				0	\$0.00	\$0.00	\$0.00	
Shower Heads									
ECO5 TOTAL:	0		0	0	0	\$0.00	\$0.00	\$0.00	
6									
Equipment Related									
ECO6 TOTAL:	0		0	0	0	\$0.00	\$0.00	\$0.00	

SYSTEMS CORP

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FY94S EEAP FT. KNOX WATER CONSERVATION STUDY

1 OF 2

CALCULATION WORK SHEET 1

DATE:

FACILITY NO.: 1610

FUNCTION:

Bowling Alley

Occupancy:

Varies

Operating Hours:

12

ECO Number ECO Type	Existing Fixture System		Retrofitted Fixture System		Usage HRS/YR	Fixtures Quantity	Water Leaks Eliminated LPY
	Description	LPM	Description	LPM			
1 Lavatory Sinks	Public Lavatory	9.5	Spring Loaded Faucets and Mixing Valve	4.7	365	10	
ECO1 TOTAL:		LPM		LPM		10	0
2 Misc. Sinks							
ECO2 TOTAL:		LPM		LPM		0	0
3 Water Closets	Floor Mounted Flush Valve	17	Install 3.5 GPF Flush Valve Repair Kit	13.2	3650	6	
ECO3 TOTAL:		LPM		LPM		6	0
4 Urinals	Wall Mounted Flush Valve	5.68	Install 1.0 GPF Flush Valve Repair Kit	3.79	3650	3	
ECO4 TOTAL:		LPM		LPM		3	0
5 Shower Heads							
ECO5 TOTAL:		LPM		LPM		0	0
6 Equipment Related							
ECO6 TOTAL:						0	0

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CALCULATION WORK SHEET 2

FACILITY NO. : 1610 Water Rate: 0.42 \$/KL Energy Rate: \$/KWH

Gas Rate: 10.51 \$/MWH Demand Rate: \$/KW

ECO Number	ECO Type	Annual Water Saving LPY	Annual Energy Saving			WATER		Total	
			ELEC KW	ELEC KWH	GAS MWH	Dollar Saving	Dollar Saving	Dollar Saving	Dollars Invested
1	Lavatory Sinks	1,308,525			3	\$543.04	\$574.47	\$2,448.00	
ECO1 TOTAL:		1,308,525	0	0	3	\$543.04	\$574.47	\$2,448.00	
2	Misc. Sinks	0			0	\$0.00	\$0.00	\$0.00	
ECO2 TOTAL:		0	0	0	0	\$0.00	\$0.00	\$0.00	
3	Water Closets	83,220				\$34.54	\$34.54	\$360.29	
ECO3 TOTAL:		83,220				\$34.54	\$34.54	\$360.29	
4	Urinals	20,696				\$8.59	\$8.59	\$190.94	
ECO4 TOTAL:		20,696				\$8.59	\$8.59	\$190.94	
5	Shower Heads	0			0	\$0.00	\$0.00	\$0.00	
ECO5 TOTAL:		0	0	0	0	\$0.00	\$0.00	\$0.00	
6	Equipment Related								
ECO6 TOTAL:		0	0	0	0	\$0.00	\$0.00	\$0.00	

SYSTEMS CORP

Systems Engineering and Management Corporation, Knoxville, TN

FY94S EEAP FT. KNOX WATER CONSERVATION STUDY

100

CALCULATION WORK SHEET 1

DATE: 31 Oct 94

1720

FUNCTION:

Training Building

100

Operating Hours:

8

FACILITY NO.:

ECO Number ECO Type	Existing Fixture System		Retrofited Fixture System		Usage HRS/YR	Fixtures Quantity	Water Leaks Eliminated LPY
	Description	LPM	Description	LPM			
1 Lavatory Sinks	Public Lavatory	15	Spring Loaded Faucets	4.7	130	3	
	Public Lavatory	9.5	Spring Loaded Faucets	4.7	130	4	
ECO1 TOTAL:		LPM		LPM		7	0
2 Misc. Sinks							
ECO2 TOTAL:		LPF		LPF	#FL/YR	0	0
3 Water Closets	Floor Mounted Flush Valve	17	Install 3.5 GPF Flush Valve	13.2	2200	26	
			Repair Kit				
ECO3 TOTAL:		LPF		LPF	#FL/YR	26	0
4 Urinals	Wall Mounted Flush Valve	5.68	Install 1.0 GPF Flush Valve	3.79	7800	10	
			Repair Kit				
ECO4 TOTAL:		LPM		LPM	HRS/YR	10	0
5 Shower Heads							
ECO5 TOTAL:		LPM		LPM		0	0
6 Equipment Related							
ECO6 TOTAL:						0	0

SYSTEMS CORP

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CALCULATION WORK SHEET 2

FACILITY NO.: 1720 Water Rate: 0.42 \$/KL Energy Rate: \$/KWH

Gas Rate: 10.51 \$/MWH Demand Rate: \$/KW

ECO Number	ECO Type	Annual Water Saving LPY	Annual Energy Saving			WATER Dollar Saving	Total Dollar Saving	Total Dollars Invested
			ELEC KW	ELEC KWH	GAS MWH			
1	Lavatory Sinks	268,515			1	\$111.43	\$117.88	\$734.40
		186,420			0	\$77.36	\$81.84	\$979.20
ECO1 TOTAL:		454,935	0	0	1	\$188.80	\$199.73	\$1,713.60
2	Misc. Sinks	0			0	\$0.00	\$0.00	\$0.00
ECO2 TOTAL:		0	0	0	0	\$0.00	\$0.00	\$0.00
3	Water Closets	217,360				\$90.20	\$90.20	\$1,561.25
ECO3 TOTAL:		217,360				\$90.20	\$90.20	\$1,561.25
4	Urinals	147,420				\$61.18	\$61.18	\$636.48
ECO4 TOTAL:		147,420				\$61.18	\$61.18	\$636.48
5	Shower Heads	0			0	\$0.00	\$0.00	\$0.00
ECO5 TOTAL:		0	0	0	0	\$0.00	\$0.00	\$0.00
6	Equipment Related							
ECO6 TOTAL:		0	0	0	0	\$0.00	\$0.00	\$0.00

SYSTEMS CORP

Systems Engineering and Management Corporation, Knoxville, TN

FY94S EEAP FT. KNOX WATER CONSERVATION STUDY

1002

CALCULATION WORK SHEET 1

DATE: 31 Oct 94

FACILITY NO.: 1724

FUNCTION: Training Building

Occupancy: 150

Operating Hours: 9

ECO Number ECO Type	Existing Fixture System		Retrofited Fixture System		Usage HRS/YR	Fixtures Quantity	Water Leaks Eliminated LPY
	Description	LPM	Description	LPM			
1 Lavatory Sinks	Public Lavatory	9.5	Spring Loaded Faucets	4.7	130	26	
ECO1 TOTAL:		LPM		LPM		26	0
2 Misc. Sinks	Service Sink	45	Install Aerators	9.5	130	2	
ECO2 TOTAL:		LPF		LPF	#FL/YR	2	0
3 Water Closets	Floor Mounted Flush Valve	17	Install 3.5 GPF Flush Valve	13.2	1700	23	
ECO3 TOTAL:		LPF		LPF	#FL/YR	23	0
4 Urinals	Wall Mounted Flush Valve	5.68	Install 1.0 GPF Flush Valve	3.79	9000	13	
ECO4 TOTAL:		LPM		LPM	HRS/YR	13	0
5 Shower Heads							
ECO5 TOTAL:		LPM		LPM		0	0
6 Equipment Related							
ECO6 TOTAL:						0	0

SYSTEMS CORP

Systems Engineering and Management Corporation, Knoxville, TN

CALCULATION WORK SHEET 2

FACILITY NO.: 1724 Water Rate: 0.42 \$/KL Energy Rate: \$/KWH

Gas Rate: 10.51 \$/MWH Demand Rate: \$/KW

ECO Number	ECO Type	Annual Water		Annual Energy Saving			WATER		Total	
		Saving	LPY	ELEC KW	ELEC KWH	GAS MWH	Dollar Saving	Dollar Saving	Dollar Saving	Dollars Invested
1	Lavatory Sinks	1,211,730				3	\$502.87	\$531.98	\$6,364.80	
		0				0	\$0.00	\$0.00	\$0.00	
ECO1 TOTAL:		1,211,730		0	0	3	\$502.87	\$531.98	\$6,364.80	
2	Misc. Sinks	553,800				1	\$2.30	\$15.60	\$19.39	
ECO2 TOTAL:		553,800		0	0	1	\$2.30	\$15.60	\$19.39	
3	Water Closets	148,580					\$61.66	\$61.66	\$1,381.10	
ECO3 TOTAL:		148,580					\$61.66	\$61.66	\$1,381.10	
4	Urinals	221,130					\$91.77	\$91.77	\$827.42	
ECO4 TOTAL:		221,130					\$91.77	\$91.77	\$827.42	
5	Shower Heads	0				0	\$0.00	\$0.00	\$0.00	
ECO5 TOTAL:		0		0	0	0	\$0.00	\$0.00	\$0.00	
6	Equipment Related									
ECO6 TOTAL:		0		0	0	0	\$0.00	\$0.00	\$0.00	

SYSTEMS CORP

Systems Engineering and Management Corporation, Knoxville, TN

FY94S EEAP FT. KNOX WATER CONSERVATION STUDY

1002

CALCULATION WORK SHEET 1

DATE: 31 Oct 94

FACILITY NO.: 1726

FUNCTION: Training Building

Occupancy: 150

Operating Hours: 9

ECO Number ECO Type	Existing Fixture System		Retrofited Fixture System		Usage HRS/YR	Fixtures Quantity	Water Leaks Eliminated LPY
	Description	LPM	Description	LPM			
1 Lavatory Sinks	Public Lavatory	9.5	Spring Loaded Faucets	4.7	130	28	
ECO1 TOTAL:							
2 Misc. Sinks	Service Sink	45	Install Aerators	9.5	130	1	0
ECO2 TOTAL:							
3 Water Closets	Floor Mounted Flush Valve	17	Install 3.5 GPF Flush Valve Repair Kit	13.2	1700	20	0
ECO3 TOTAL:							
4 Urinals	Wall Mounted Flush Valve	5.68	Install 1.0 GPF Flush Valve Repair Kit	3.79	9000	14	0
ECO4 TOTAL:							
5 Shower Heads							
ECO5 TOTAL:							
6 Equipment Related							
ECO6 TOTAL:							

SYSTEMS CORP

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CALCULATION WORK SHEET 2

FACILITY NO.: 1726 Water Rate: 0.42 \$/KL Energy Rate: \$/KWH

Gas Rate: 10.51 \$/MWH Demand Rate: \$/KW

ECO Number	Annual Water Saving LPY	Annual Energy Saving			WATER		Total	Total
ECO Type		ELEC KW	ELEC KWH	GAS MWH	Dollar Saving	Dollar Saving	Dollars Invested	
1	1,304,940			3	\$541.55	\$572.90	\$6,854.40	
Lavatory Sinks	0			0	\$0.00	\$0.00	\$0.00	
ECO1 TOTAL:	1,304,940	0	0	3	\$541.55	\$572.90	\$6,854.40	
2	276,900			1	\$1.15	\$7.80	\$9.70	
Misc. Sinks								
ECO2 TOTAL:	276,900	0	0	1	\$1.15	\$7.80	\$9.70	
3	129,200				\$53.62	\$53.62	\$1,200.96	
Water Closets								
ECO3 TOTAL:	129,200				\$53.62	\$53.62	\$1,200.96	
4	238,140				\$98.83	\$98.83	\$891.07	
Urinals								
ECO4 TOTAL:	238,140				\$98.83	\$98.83	\$891.07	
5	0			0	\$0.00	\$0.00	\$0.00	
Shower Heads								
ECO5 TOTAL:	0	0	0	0	\$0.00	\$0.00	\$0.00	
6								
Equipment Related								
ECO6 TOTAL:	0	0	0	0	\$0.00	\$0.00	\$0.00	

SYSTEMS CORP

Systems Engineering and Management Corporation, Knoxville, TN

FY94S EEAP FT. KNOX WATER CONSERVATION STUDY										1002
CALCULATION WORK SHEET 1										DATE: 31 Oct 94
FACILITY NO.:		1730		FUNCTION:		Training Building				
Occupancy:		130		Operating Hours:		9				
ECO Number	ECO Type	Existing Fixture System	Description	Retrofitted Fixture System	Description	LPM	Usage HRS/YR	Fixtures Quantity	Water Leaks Eliminated LPY	
1	Lavatory Sinks	Public Lavatory			Spring Loaded Faucets	9.5	130	2		
ECO1 TOTAL:						LPM		2	0	
2	Misc. Sinks									
ECO2 TOTAL:										
3	Water Closets	Floor Mounted Flush Valve			Install 3.5 GPF Flush Valve	17	2200	17		
					Repair Kit					
ECO3 TOTAL:						LPF		17	0	
4	Urinals	Wall Mounted Flush Valve			Install 1.0 GPF Flush Valve	5.68	6000	17		
					Repair Kit					
ECO4 TOTAL:						LPF		17	0	
5	Shower Heads									
ECO5 TOTAL:						LPM		0	0	
6	Equipment Related									
ECO6 TOTAL:								0	0	

FY94S EEAP FT. KNOX WATER CONSERVATION STUDY 2 OF 2

CALCULATION WORK SHEET 2

FACILITY NO.: 1730
 Water Rate: 0.42 \$/KL Energy Rate: \$/KWH
 Gas Rate: 10.51 \$/MWH Demand Rate: \$/KW

ECO Number	Annual Water Saving LPY	Annual Energy Saving			WATER		Total	Total
ECO Type		ELEC KW	ELEC KWH	GAS MWH	Dollar Saving	Dollar Saving	Dollars Invested	
1 Lavatory Sinks	93,210 0			0 0	\$38.68 \$0.00	\$40.92 \$0.00	\$489.60 \$0.00	
ECO1 TOTAL:	93,210 0	0 0	0 0	0 0	\$38.68 \$0.00	\$40.92 \$0.00	\$489.60 \$0.00	
2 Misc. Sinks								
ECO2 TOTAL:	0 142,120	0 0	0 0	0 0	\$0.00 \$58.98	\$0.00 \$58.98	\$0.00 \$1,020.82	
3 Water Closets								
ECO3 TOTAL:	142,120 192,780				\$58.98 \$80.00	\$58.98 \$80.00	\$1,020.82 \$1,082.02	
4 Urinals								
ECO4 TOTAL:	192,780 0				\$80.00 \$0.00	\$80.00 \$0.00	\$1,082.02 \$0.00	
5 Shower Heads								
ECO5 TOTAL:	0 6	0 0	0 0	0 0	\$0.00 \$0.00	\$0.00 \$0.00	\$0.00 \$0.00	
Equipment Related								
ECO6 TOTAL:	0	0	0	0	\$0.00	\$0.00	\$0.00	

SYSTEMS CORP

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FY94S EEAP FT. KNOX WATER CONSERVATION STUDY

1002

CALCULATION WORK SHEET 1

DATE: 31 Oct 94

FACILITY NO.: 1810

FUNCTION: Training Building

Occupancy: 6 Operating Hours: 8

ECO Number ECO Type	Existing Fixture System		Retrofited Fixture System		Usage HRS/YR	Fixtures Quantity	Water Leaks Eliminated LPY
	Description	LPM	Description	LPM			
1	Public Lavatory	15	Spring Loaded Faucets	4.7	130	1	
Lavatory Sinks							
ECO1 TOTAL:		LPM		LPM		1	0
2							
Misc. Sinks							
ECO2 TOTAL:		LPF		LPF	#FL/YR	0	0
3	Tank Type (public)	11.4	Install 1.6 GPF Tank Type	6	8700	1	
Water Closets							
ECO3 TOTAL:		LPF		LPF	#FL/YR	1	0
4							
Urinals							
ECO4 TOTAL:		LPM		LPM	HRS/YR	0	0
5							
Shower Heads							
ECO5 TOTAL:		LPM		LPM		0	0
6							
Equipment Related							
ECO6 TOTAL:						0	0

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CALCULATION WORK SHEET 2

FACILITY NO.: 1810 Water Rate: 0.42 \$/KL Energy Rate: \$/KWH

Gas Rate: 10.51 \$/MWH Demand Rate: \$/KW

ECO Number	Annual Water Saving LPY	Annual Energy Saving			WATER		Total	Total
ECO Type		ELEC KW	ELEC KWH	GAS MWH	Dollar Saving	Dollar Saving	Dollar Saving	Dollars Invested
1	89,505			0	\$37.14	\$39.29	\$244.80	
Lavatory Sinks	0			0	\$0.00	\$0.00	\$0.00	\$0.00
ECO1 TOTAL:	89,505	0	0	0	\$37.14	\$39.29	\$244.80	
2	0			0	\$0.00	\$0.00	\$0.00	
Misc. Sinks								
ECO2 TOTAL:	0	0	0	0	\$0.00	\$0.00	\$0.00	\$0.00
3	46,980				\$19.50	\$19.50	\$419.16	
Water Closets								
ECO3 TOTAL:	46,980				\$19.50	\$19.50	\$419.16	
4	0				\$0.00	\$0.00	\$0.00	
Urinals								
ECO4 TOTAL:	0				\$0.00	\$0.00	\$0.00	\$0.00
5	0			0	\$0.00	\$0.00	\$0.00	\$0.00
Shower Heads								
ECO5 TOTAL:	0	0	0	0	\$0.00	\$0.00	\$0.00	\$0.00
6								
Equipment Related								
ECO6 TOTAL:	0	0	0	0	\$0.00	\$0.00	\$0.00	\$0.00

SYSTEMS CORP

Systems Engineering and Management Corporation, Knoxville, TN

FY94S EEAP FT. KNOX WATER CONSERVATION STUDY

1002

CALCULATION WORK SHEET 1

DATE: 31 Oct 94

FACILITY NO.: 1996

FUNCTION: Training Building

Occupancy: 35

Operating Hours: 8

ECO Number ECO Type	Existing Fixture System		Retrofited Fixture System		Usage HRS/YR	Fixtures Quantity	Water Leaks Eliminated LPY
	Description	LPM	Description	LPM			
1 Lavatory Sinks	Public Lavatory	9.5	Spring Loaded Faucets	4.7	130	4	
	Private Lavatory	9.5	Spring Loaded Faucets	4.7	130	1	
ECO1 TOTAL:		LPM		LPM		5	0
2 Misc. Sinks							
ECO2 TOTAL:		LPF		LPF	#FL/YR	0	0
3 Water Closets	Floor Mounted Flush Valve	17	Install 3.5 GPF Flush Valve	13.2	3000	5	
			Repair Kit				
ECO3 TOTAL:		LPF		LPF	#FL/YR	5	0
4 Urinals	Wall Mounted Flush Valve	5.68	Install 1.0 GPF Flush Valve	3.79	12000	4	
			Repair Kit				
ECO4 TOTAL:		LPM		LPM	HRS/YR	4	0
5 Shower Heads							
ECO5 TOTAL:		LPM		LPM		0	0
6 Equipment Related							
ECO6 TOTAL:						0	0

SYSTEMS CORP

Systems Engineering and Management Corporation, Knoxville, TN

CALCULATION WORK SHEET 2

FACILITY NO.: 1996
 Water Rate: 0.42 \$/KL Energy Rate: \$/KWH
 Gas Rate: 10.51 \$/MWH Demand Rate: \$/KW

ECO Number	ECO Type	Annual Water Saving LPY	Annual Energy Saving			WATER		Total	
			ELEC KW	ELEC KWH	GAS MWH	Dollar Saving	Dollar Saving	Dollar Saving	Dollars Invested
1	Lavatory Sinks	186,420			0	\$77.36	\$81.84	\$979.20	
		46,605			0	\$19.34	\$20.46	\$244.80	
ECO1 TOTAL:		233,025	0	0	1	\$96.71	\$102.30	\$1,224.00	
2	Misc. Sinks	0			0	\$0.00	\$0.00	\$0.00	
ECO2 TOTAL:		0	0	0	0	\$0.00	\$0.00	\$0.00	
3	Water Closets	57,000				\$23.66	\$23.66	\$300.24	
ECO3 TOTAL:		57,000				\$23.66	\$23.66	\$300.24	
4	Urinals	90,720				\$37.65	\$37.65	\$254.59	
ECO4 TOTAL:		90,720				\$37.65	\$37.65	\$254.59	
5	Shower Heads	0			0	\$0.00	\$0.00	\$0.00	
ECO5 TOTAL:		0	0	0	0	\$0.00	\$0.00	\$0.00	
6	Equipment Related								
ECO6 TOTAL:		0	0	0	0	\$0.00	\$0.00	\$0.00	

SYSTEMS CORP

Systems Engineering and Management Corporation, Knoxville, TN

FY94S EEAP FT. KNOX WATER CONSERVATION STUDY

1002

CALCULATION WORK SHEET 1

DATE: 31 Oct 94

FACILITY NO.: 1997

FUNCTION: Training Building

Occupancy: 40

Operating Hours: 12

ECO Number ECO Type	Existing Fixture System		Retrofitted Fixture System		Usage HRS/YR	Fixtures Quantity	Water Leaks Eliminated LPY
	Description	LPM	Description	LPM			
1	Public Lavatory	15	Spring Loaded Faucets	4.7	130	4	
Lavatory Sinks							
ECO1 TOTAL:		LPM		LPM		4	0
2							
Misc. Sinks							
ECO2 TOTAL:		LPF		LPF	#FL/YR	0	0
3	Tank Type (public)	11.4	Install 1.6 GPF Tank Type	6	3600	4	
Water Closets							
ECO3 TOTAL:		LPF		LPF	#FL/YR	4	0
4	Wall Mounted Flush Valve	5.68	Install 1.0 GPF Flush Valve	3.79	28000	2	
Urinals							
ECO4 TOTAL:		LPM		LPM	HRS/YR	2	0
5							
Shower Heads							
ECO5 TOTAL:		LPM		LPM		0	0
6							
Equipment Related							
ECO6 TOTAL:						0	0

SYSTEMS CORP

Systems Engineering and Management Corporation, Knoxville, TN

CALCULATION WORK SHEET 2

FACILITY NO. : 1997 Water Rate: 0.42 \$/KL Energy Rate: \$/KWH

Gas Rate: 10.51 \$/MWH Demand Rate: \$/KW

ECO Number	ECO Type	Annual Water Saving LPY	Annual Energy Saving			WATER Dollar Saving	Total Dollar Saving	Total Dollars Invested
			ELEC KW	ELEC KWH	GAS MWH			
1	Lavatory Sinks	358,020			1	\$148.58	\$157.18	\$979.20
		0			0	\$0.00	\$0.00	\$0.00
ECO1 TOTAL:		358,020	0	0	1	\$148.58	\$157.18	\$979.20
2	Misc. Sinks	0			0	\$0.00	\$0.00	\$0.00
ECO2 TOTAL:		0	0	0	0	\$0.00	\$0.00	\$0.00
3	Water Closets	77,760				\$32.27	\$32.27	\$240.19
ECO3 TOTAL:		77,760				\$32.27	\$32.27	\$240.19
4	Urinals	105,840				\$43.92	\$43.92	\$127.30
ECO4 TOTAL:		105,840				\$43.92	\$43.92	\$127.30
5	Shower Heads	0			0	\$0.00	\$0.00	\$0.00
ECO5 TOTAL:		0	0	0	0	\$0.00	\$0.00	\$0.00
6	Equipment Related							
ECO6 TOTAL:		0	0	0	0	\$0.00	\$0.00	\$0.00

SYSTEMS CORP

Systems Engineering and Management Corporation, Knoxville, TN

FY94S EEAP FT. KNOX WATER CONSERVATION STUDY

1002

CALCULATION WORK SHEET 1

DATE: 31 Oct 94

FACILITY NO.:

1998

FUNCTION:

Admin. Fac.

Occupancy:

4

Operating Hours:

8

ECO Number ECO Type	Existing Fixture System		Retrofited Fixture System		Usage HRS/YR	Fixtures Quantity	Water Leaks Eliminated LPY
	Description	LPM	Description	LPM			
1	Public Lavatory	9.5	Spring Loaded Faucets	4.7	130	2	
Lavatory Sinks	Public Lavatory	23	Spring Loaded Faucets	4.7	130	2	
ECO1 TOTAL:		LPM		LPM		4	0
2							
Misc. Sinks							
ECO2 TOTAL:							
3	Tank Type (publi)	11.4	Install 1.6 GPF Tank Type	6	1560	3	0
Water Closets			Water Closet				
ECO3 TOTAL:							
4	Wall Mounted Flush Valve	5.68	Install 1.0 GPF Flush Valve	3.79	2900	2	0
Urinals			Repair Kit				
ECO4 TOTAL:							
5							
Shower Heads							
ECO5 TOTAL:							
6							
Equipment							
Related							
ECO6 TOTAL:						0	0

SYSTEMS CORP

Systems Engineering and Management Corporation, Knoxville, TN

CALCULATION WORK SHEET 2

FACILITY NO.: 1998

Water Rate: 0.42 \$/KL

Energy Rate: \$/KWH

Gas Rate: 10.51 \$/MWH

Demand Rate: \$/KW

ECO Number	ECO Type	Annual Water		Annual Energy Saving			WATER		Total	
		Saving	LPY	ELEC KW	ELEC KWH	GAS MWH	Dollar Saving	Dollar Saving	Dollar Saving	Dollars Invested
1	Lavatory Sinks	93,210				0	\$38.68	\$40.92	\$489.60	
		303,810				1	\$126.08	\$133.38	\$489.60	
ECO1 TOTAL:		397,020		0	0	1	\$164.76	\$174.30	\$979.20	
2	Misc. Sinks	0				0	\$0.00	\$0.00	\$0.00	
ECO2 TOTAL:		0		0	0	0	\$0.00	\$0.00	\$0.00	
3	Water Closets	25,272					\$10.49	\$10.49	\$1,257.48	
ECO3 TOTAL:		25,272					\$10.49	\$10.49	\$1,257.48	
4	Urinals	10,962					\$4.55	\$4.55	\$127.30	
ECO4 TOTAL:		10,962					\$4.55	\$4.55	\$127.30	
5	Shower Heads	0				0	\$0.00	\$0.00	\$0.00	
ECO5 TOTAL:		0		0	0	0	\$0.00	\$0.00	\$0.00	
6	Equipment Related									
ECO6 TOTAL:		0		0	0	0	\$0.00	\$0.00	\$0.00	

SYSTEMS CORP

Systems Engineering and Management Corporation, Knoxville, TN

FY94S EEAP FT. KNOX WATER CONSERVATION STUDY

1002

CALCULATION WORK SHEET 1

DATE: 31 Oct 94

FACILITY NO.:

2010

FUNCTION:

Training Building

Occupancy:

100

Operating Hours:

8

ECO Number ECO Type	Existing Fixture System		Retrofited Fixture System		Usage HRS/YR	Fixtures Quantity	Water Leaks Eliminated LPY
	Description	LPM	Description	LPM			
1	Public Lavatory	15	Spring Loaded Faucets	4.7	130	19	
Lavatory Sinks							
ECO1 TOTAL:		LPM		LPM		19	0
2							
Misc. Sinks							
ECO2 TOTAL:		LPF		LPF	#FL/YR	0	0
3	Floor Mounted Flush Valve	17	Install 3.5 GPF Flush Valve	13.2	3000	15	
Water Closets							
			Repair Kit				
ECO3 TOTAL:		LPF		LPF	#FL/YR	15	0
4	Wall Mounted Flush Valve	5.68	Install 1.0 GPF Flush Valve	3.79	6500	21	
Urinals							
			Repair Kit				
ECO4 TOTAL:		LPM		LPM	HRS/YR	21	0
5							
Shower Heads							
ECO5 TOTAL:		LPM		LPM		0	0
6							
Equipment Related							
ECO6 TOTAL:						0	0

SYSTEMS CORP

Systems Engineering and Management Corporation, Knoxville, TN

CALCULATION WORK SHEET 2

FACILITY NO.: 2010 Water Rate: 0.42 \$/KL Energy Rate: \$/KWH

Gas Rate: 10.51 \$/MWH Demand Rate: \$/KW

ECO Number	Annual Water Saving LPY	Annual Energy Saving			WATER		Total	Total
ECO Type		ELEC KW	ELEC KWH	GAS MWH	Dollar Saving	Dollar Saving	Dollar Saving	Dollars Invested
1 Lavatory Sinks	1,700,595 0			4 0	\$705.75 \$0.00	\$746.60 \$0.00	\$4,651.20 \$0.00	
ECO1 TOTAL:	1,700,595 0	0	0	4 0	\$705.75 \$0.00	\$746.60 \$0.00	\$4,651.20 \$0.00	
2 Misc. Sinks								
ECO2 TOTAL:	0 171,000	0	0	0	\$0.00 \$70.97	\$0.00 \$70.97	\$0.00 \$900.72	
3 Water Closets								
ECO3 TOTAL:	171,000 257,985				\$70.97 \$107.06	\$70.97 \$107.06	\$900.72 \$1,336.61	
4 Urinals								
ECO4 TOTAL:	257,985 0			0	\$107.06 \$0.00	\$107.06 \$0.00	\$1,336.61 \$0.00	
5 Shower Heads								
ECO5 TOTAL:	0 6	0	0	0	\$0.00 \$0.00	\$0.00 \$0.00	\$0.00 \$0.00	
6 Equipment Related								
ECO6 TOTAL:	0	0	0	0	\$0.00	\$0.00	\$0.00	\$0.00

SYSTEMS CORP

Systems Engineering and Management Corporation, Knoxville, TN

FY94S EEAP FT. KNOX WATER CONSERVATION STUDY

1002

DATE: 31 Oct 94

CALCULATION WORK SHEET 1

FUNCTION: Training Building

2020

FACILITY NO.:

Operating Hours: 8

40

Occupancy:

ECO Number ECO Type	Existing Fixture System		Retrofitted Fixture System		Usage HRS/YR	Fixtures Quantity	Water Leaks Eliminated LPY
	Description	LPM	Description	LPM			
1 Lavatory Sinks	Public Lavatory	9.5	Spring Loaded Faucets	4.7	130	7	
	Public Lavatory	15	Spring Loaded Faucets	4.7	130	2	
ECO1 TOTAL:		LPM		LPM		9	0
2 Misc. Sinks							
ECO2 TOTAL:		LPF		LPF	#FL/YR	0	0
3 Water Closets	Floor Mounted Flush Valve	17	Install 3.5 GPF Flush Valve	13.2	1300	8	
			Repair Kit				
ECO3 TOTAL:		LPF		LPF	#FL/YR	8	0
4 Urinals	Wall Mounted Flush Valve	5.68	Install 1.0 GPF Flush Valve	3.79	3120	11	
			Repair Kit				
ECO4 TOTAL:		LPM		LPM	HRS/YR	11	0
5 Shower Heads							
ECO5 TOTAL:		LPM		LPM		0	0
6 Equipment Related							
ECO6 TOTAL:						0	0

SYSTEMS CORP

Systems Engineering and Management Corporation, Knoxville, TN

CALCULATION WORK SHEET 2

FACILITY NO. : 2020 Water Rate: 0.42 \$/KL Energy Rate: \$/KWH

Gas Rate: 10.51 \$/MWH Demand Rate: \$/KW

ECO Number	ECO Type	Annual Water		Annual Energy Saving			WATER		Total		Total	
		Saving	LPY	ELEC KW	ELEC KWH	GAS MWH	Dollar Saving		Dollar Saving		Dollars Invested	
1	Lavatory Sinks	326,235				1	\$135.39		\$143.22		\$1,713.60	
		179,010				0	\$74.29		\$78.59		\$489.60	
ECO1 TOTAL:		505,245		0	0	1	\$209.68		\$221.81		\$2,203.20	
2	Misc. Sinks	0				0	\$0.00		\$0.00		\$0.00	
ECO2 TOTAL:		0		0	0	0	\$0.00		\$0.00		\$0.00	
3	Water Closets	39,520					\$16.40		\$16.40		\$480.38	
ECO3 TOTAL:		39,520					\$16.40		\$16.40		\$480.38	
4	Urinals	64,865					\$26.92		\$26.92		\$700.13	
ECO4 TOTAL:		64,865					\$26.92		\$26.92		\$700.13	
5	Shower Heads	0				0	\$0.00		\$0.00		\$0.00	
ECO5 TOTAL:		0		0	0	0	\$0.00		\$0.00		\$0.00	
6	Equipment Related											
ECO6 TOTAL:		0		0	0	0	\$0.00		\$0.00		\$0.00	

SYSTEMS CORP

Systems Engineering and Management Corporation, Knoxville, TN

FY94S EEAP FT. KNOX WATER CONSERVATION STUDY										1002
CALCULATION WORK SHEET 1										DATE: 31 Oct 94
FACILITY NO. : 2339		FUNCTION: Admin. Fac.								
Occupancy:		Operating Hours: 8								
ECO Number	ECO Type	Existing Fixture System	Retrofitted Fixture System	Usage	Fixtures	Water Leaks				
		Description	Description	HRS/YR	Quantity	Eliminated LPY				
1	Lavatory Sinks	Public Lavatory	Spring Loaded Faucets	4.7	130	3				
ECO1 TOTAL:										
2	Misc. Sinks									
ECO2 TOTAL:										
3	Water Closets	Floor Mounted Flush Valve	Install 3.5 GPF Flush Valve	17	2500	6				
			Repair Kit							
ECO3 TOTAL :										
4	Urinals	Wall Mounted Flush Valve	Install 1.0 GPF Flush Valve	5.68	2500	3				
			Repair Kit							
ECO4 TOTAL :										
5	Shower Heads									
ECO5 TOTAL :										
6	Equipment Related									
ECO6 TOTAL :										

CALCULATION WORK SHEET 2

FACILITY NO.: 2339 Water Rate: 0.42 \$/KL Energy Rate: \$/KWH

Gas Rate: 10.51 \$/MWH Demand Rate: \$/KW

ECO Number	Annual Water Saving LPY	Annual Energy Saving			WATER		Total	Total
ECO Type		ELEC KW	ELEC KWH	GAS MWH	Dollar Saving	Dollar Saving	Dollar Saving	Dollars Invested
1 Lavatory Sinks	139,815 0			0 0	\$58.02 \$0.00	\$61.38 \$0.00	\$734.40 \$0.00	
ECO1 TOTAL:	139,815	0	0	0	\$58.02	\$61.38	\$734.40	
2 Misc. Sinks	0			0	\$0.00	\$0.00	\$0.00	
ECO2 TOTAL:	0	0	0	0	\$0.00	\$0.00	\$0.00	
3 Water Closets	57,000				\$23.66	\$23.66	\$360.29	
ECO3 TOTAL:	57,000				\$23.66	\$23.66	\$360.29	
4 Urinals	14,175				\$5.88	\$5.88	\$190.94	
ECO4 TOTAL:	14,175				\$5.88	\$5.88	\$190.94	
5 Shower Heads	0			0	\$0.00	\$0.00	\$0.00	
ECO5 TOTAL:	0	0	0	0	\$0.00	\$0.00	\$0.00	
6 Equipment Related								
ECO6 TOTAL:	0	0	0	0	\$0.00	\$0.00	\$0.00	

SYSTEMS CORP

Systems Engineering and Management Corporation, Knoxville, TN

FY94S EEAP FT. KNOX WATER CONSERVATION STUDY

1002

CALCULATION WORK SHEET 1

DATE: 31 Oct 94

FACILITY NO. : 2352

FUNCTION: Training Building

Occupancy: 40

Operating Hours: 10

ECO Number ECO Type	Existing Fixture System		Retrofitted Fixture System		Usage HRS/YR	Fixtures Quantity	Water Leaks Eliminated LPY
	Description	LPM	Description	LPM			
1	Public Lavatory	9.5	Spring Loaded Faucets	4.7	130	2	
Lavatory Sinks							
ECO1 TOTAL:		LPM		LPM		2	0
2							
Misc. Sinks							
ECO2 TOTAL:		LPF		LPF	#FL/YR	0	0
3	Floor Mounted Flush Valve	17	Install 3.5 GPF Flush Valve	13.2	3000	2	
Water Closets							
			Repair Kit				
ECO3 TOTAL :		LPF		LPF	#FL/YR	2	0
4	Wall Mounted Flush Valve	5.68	Install 1.0 GPF Flush Valve	3.79	10400	1	
Urinals							
			Repair Kit				
ECO4 TOTAL :		LPM		LPM	HRS/YR	1	0
5							
Shower Heads							
ECO5 TOTAL :		LPM		LPM		0	0
6							
Equipment Related							
ECO6 TOTAL :						0	0

SYSTEMS CORP

Systems Engineering and Management Corporation, Knoxville, TN

CALCULATION WORK SHEET 2

FACILITY NO.: 2352 Water Rate: 0.42 \$/KL Energy Rate: \$/KWH

Gas Rate: 10.51 \$/MWH Demand Rate: \$/KW

ECO Number	ECO Type	Annual Water		Annual Energy Saving			WATER		Total	
		Saving	LPY	ELEC KW	ELEC KWH	GAS MWH	Dollar Saving	Dollar Saving	Dollar Saving	Dollars Invested
1	Lavatory Sinks	93,210				0	\$38.68	\$40.92	\$489.60	
		0				0	\$0.00	\$0.00	\$0.00	
ECO1 TOTAL:		93,210		0	0	0	\$38.68	\$40.92	\$489.60	
2	Misc. Sinks	0				0	\$0.00	\$0.00	\$0.00	
ECO2 TOTAL:		0		0	0	0	\$0.00	\$0.00	\$0.00	
3	Water Closets	22,800					\$9.46	\$9.46	\$120.10	
ECO3 TOTAL:		22,800					\$9.46	\$9.46	\$120.10	
4	Urinals	19,656					\$8.16	\$8.16	\$63.65	
ECO4 TOTAL:		19,656					\$8.16	\$8.16	\$63.65	
5	Shower Heads	0				0	\$0.00	\$0.00	\$0.00	
ECO5 TOTAL:		0		0	0	0	\$0.00	\$0.00	\$0.00	
6	Equipment Related									
ECO6 TOTAL:		0		0	0	0	\$0.00	\$0.00	\$0.00	

SYSTEMS CORP

Systems Engineering and Management Corporation, Knoxville, TN

FY94S EEAP FT. KNOX WATER CONSERVATION STUDY										1002
CALCULATION WORK SHEET 1										DATE: 31 Oct 94
FACILITY NO. :		2368		FUNCTION:		Admin. & Training				
Occupancy:				Operating Hours:		8				
ECO Number ECO Type	Existing Fixture System		Retrofitted Fixture System		Usage HRS/YR	Fixtures Quantity	Water Leaks Eliminated LPY			
	Description	LPM	Description	LPM						
1	Public Lavatory	9.5	Spring Loaded Faucets	4.7	130	5				
	Public Lavatory	23	Spring Loaded Faucets	4.7	130	12				
ECO1 TOTAL:		LPM		LPM		17	0			
2										
Misc. Sinks										
ECO2 TOTAL:		LPF		LPF	#FL/YR	0	0			
3	Floor Mounted Flush Valve	17	Install 3.5 GPF Flush Valve	13.2	5720	11				
			Repair Kit							
ECO3 TOTAL :		LPF		LPF	#FL/YR	11	0			
4	Wall Mounted Flush Valve	5.68	Install 1.0 GPF Flush Valve	3.79	8000	17				
			Repair Kit							
ECO4 TOTAL :		LPM		LPM	HRS/YR	17	0			
5										
Shower Heads										
ECO5 TOTAL :		LPM		LPM		0	0			
6										
Equipment Related										
ECO6 TOTAL :						0	0			

CALCULATION WORK SHEET 2

FACILITY NO.: 2368 Water Rate: 0.42 \$/KL Energy Rate: \$/KWH

Gas Rate: 10.51 \$/MWH Demand Rate: \$/KW

ECO Number	Annual Water Saving	LPY	Annual Energy Saving			WATER Dollar Saving	Total Dollar Saving	Total Dollars Invested
			ELEC KW	ELEC KWH	GAS MWH			
1 Lavatory Sinks	233,025				1	\$96.71	\$102.30	\$1,224.00
	1,822,860				4	\$756.49	\$800.28	\$2,937.60
ECO1 TOTAL:	2,055,885		0	0	5	\$853.19	\$902.58	\$4,161.60
2 Misc. Sinks	0				0	\$0.00	\$0.00	\$0.00
ECO2 TOTAL:	0		0	0	0	\$0.00	\$0.00	\$0.00
3 Water Closets	239,096					\$99.22	\$99.22	\$660.53
ECO3 TOTAL:	239,096					\$99.22	\$99.22	\$660.53
4 Urinals	257,040					\$106.67	\$106.67	\$1,082.02
ECO4 TOTAL:	257,040					\$106.67	\$106.67	\$1,082.02
5 Shower Heads	0				0	\$0.00	\$0.00	\$0.00
ECO5 TOTAL:	0		0	0	0	\$0.00	\$0.00	\$0.00
6 Equipment Related								
ECO6 TOTAL:	0		0	0	0	\$0.00	\$0.00	\$0.00

SYSTEMS CORP

Systems Engineering and Management Corporation, Knoxville, TN

FY94S EEAP FT. KNOX WATER CONSERVATION STUDY

1 2

CALCULATION WORK SHEET 1

DATE: 31 Oct 94

FACILITY NO.: 2369

FUNCTION:

Training Building

Occupancy: 30

Operating Hours:

8

ECO Number ECO Type	Existing Fixture System		Retrofited Fixture System		Usage HRS/YR	Fixtures Quantity	Water Leaks Eliminated LPY
	Description	LPM	Description	LPM			
1	Public Lavatory	9.5	Spring Loaded Faucets	4.7	130	4	
	Public Lavatory	15	Spring Loaded Faucets	4.7	130	2	
ECO1 TOTAL:		LPM		LPM		6	0
2							
Misc. Sinks							
ECO2 TOTAL:		LPF		LPF	#FL/YR	0	0
3	Floor Mounted Flush Valve	17	Install 3.5 GPF Flush Valve	13.2	2200	7	
Water Closets			Repair Kit				
ECO3 TOTAL:		LPF		LPF	#FL/YR	7	0
4	Wall Mounted Flush Valve	5.68	Install 1.0 GPF Flush Valve	3.79	8000	5	
Urinals			Repair Kit				
ECO4 TOTAL:		LPM		LPM	HRS/YR	5	0
5							
Shower Heads							
ECO5 TOTAL:		LPM		LPM		0	0
6							
Equipment							
Related							
ECO6 TOTAL:						0	0

SYSTEMS CORP

Systems Engineering and Management Corporation, Knoxville, TN

CALCULATION WORK SHEET 2

FACILITY NO.: 2369
 Water Rate: 0.42 \$/KL Energy Rate: \$/KWH
 Gas Rate: 10.51 \$/MWH Demand Rate: \$/KW

ECO Number	ECO Type	Annual Water Saving LPY	Annual Energy Saving			WATER	Total	Total	Dollars Invested
			ELEC KW	ELEC KWH	GAS MWH				
1	Lavatory Sinks	186,420			0	\$77.36	\$81.84	\$979.20	
		179,010			0	\$74.29	\$78.59	\$489.60	
ECO1 TOTAL:		365,430	0	0	1	\$151.65	\$160.43	\$1,468.80	
2	Misc. Sinks	0			0	\$0.00	\$0.00	\$0.00	
ECO2 TOTAL:		0	0	0	0	\$0.00	\$0.00	\$0.00	
3	Water Closets	58,520				\$24.29	\$24.29	\$420.34	
ECO3 TOTAL:		58,520				\$24.29	\$24.29	\$420.34	
4	Urinals	75,600				\$31.37	\$31.37	\$318.24	
ECO4 TOTAL:		75,600				\$31.37	\$31.37	\$318.24	
5	Shower Heads	0			0	\$0.00	\$0.00	\$0.00	
ECO5 TOTAL:		0	0	0	0	\$0.00	\$0.00	\$0.00	
6	Equipment Related								
ECO6 TOTAL:		0	0	0	0	\$0.00	\$0.00	\$0.00	

SYSTEMS CORP

Systems Engineering and Management Corporation, Knoxville, TN

DATE:

CALCULATION WORK SHEET 1

Bowling Alley

FUNCTION:

2385

FACILITY NO.:

14

Operating Hours:

Varies

Occupancy:

ECO Number ECO Type	Existing Fixture System		Retrofited Fixture System		Usage HRS/YR	Fixtures Quantity	Water Leaks Eliminated LPY
	Description	LPM	Description	LPM			
1	Public Lavatory	9.5	Spring Loaded Faucets and Mixing Valve	4.7	365	7	
Lavatory Sinks							
ECO1 TOTAL:							
2	Service Sink	45	Install Aerators	9.5	182	1	0
Misc. Sinks							
ECO2 TOTAL:							
3	Floor Mounted Flush Valve	17	Install 3.5 GPF Flush Valve Repair Kit	13.2	3650	7	0
Water Closets							
ECO3 TOTAL:							
4	Wall Mounted Flush Valve	5.68	Install 1.0 GPF Flush Valve Repair Kit	3.79	3650	3	0
Urinals							
ECO4 TOTAL:							
5							
Shower Heads							
ECO5 TOTAL:							
6							
Equipment Related							
ECO6 TOTAL:							
						0	0

SYSTEMS CORP

Systems Engineering and Management Corporation, Knoxville, TN

CALCULATION WORK SHEET 2

FACILITY NO.: 2385 Water Rate: 0.42 \$/KL Energy Rate: \$/KWH

Gas Rate: 10.51 \$/MWH Demand Rate: \$/KW

ECO Number	ECO Type	Annual Water Saving LPY	Annual Energy Saving			WATER	Total	
			ELEC KW	ELEC KWH	GAS MWH		Dollar Saving	Dollars Invested
1	Lavatory Sinks	915,968			2	\$380.13	\$402.13	\$1,713.60
ECO1 TOTAL:		915,968	0	0	2	\$380.13	\$402.13	\$1,713.60
2	Misc. Sinks	387,660			1	\$1.61	\$1.70	\$9.70
ECO2 TOTAL:		387,660	0	0	1	\$1.61	\$1.70	\$9.70
3	Water Closets	97,090				\$40.29	\$40.29	\$420.34
ECO3 TOTAL:		97,090				\$40.29	\$40.29	\$420.34
4	Urinals	20,696				\$8.59	\$8.59	\$190.94
ECO4 TOTAL:		20,696				\$8.59	\$8.59	\$190.94
5	Shower Heads	0			0	\$0.00	\$0.00	\$0.00
ECO5 TOTAL:		0	0	0	0	\$0.00	\$0.00	\$0.00
6	Equipment Related							
ECO6 TOTAL:		0	0	0	0	\$0.00	\$0.00	\$0.00

SYSTEMS CORP

Systems Engineering and Management Corporation, Knoxville, TN

FY94S EEAP FT. KNOX WATER CONSERVATION STUDY										1	2
CALCULATION WORK SHEET 1										DATE:	31 Oct 94
FACILITY NO.:		2425		FUNCTION:		Training Building					
Occupancy:		50		Operating Hours:		10					
ECO Number	ECO Type	Existing Fixture System		Retrofited Fixture System		Usage	Fixtures	Water Leaks			
		Description	LPM	Description	LPM	HRS/YR	Quantity	Eliminated LPY			
1	Lavatory Sinks	Public Lavatory	9.5	Spring Loaded Faucets	4.7	130	2				
ECO1 TOTAL:											
2	Misc. Sinks	Service Sink	15	Install Aerators	9.5	130	1				
ECO2 TOTAL:											
3	Water Closets	Tank Type (public)	11.4	Install 1.6 GPF Tank Type	6	3000	3				
ECO3 TOTAL:											
4	Urinals	Wall Mounted Flush Valve	5.68	Install 1.0 GPF Flush Valve	3.79	6500	2				
ECO4 TOTAL:											
5	Shower Heads										
ECO5 TOTAL:											
6	Equipment Related										
ECO6 TOTAL:											

CALCULATION WORK SHEET 2

FACILITY NO.: 2425 Water Rate: 0.42 \$/KL Energy Rate: \$/KWH

Gas Rate: 10.51 \$/MWH Demand Rate: \$/KW

ECO Number	Annual Water Saving	LPY	Annual Energy Saving			WATER Dollar Saving	Total Dollar Saving	Total Dollars Invested
			ELEC KW	ELEC KWH	GAS MWH			
1	93,210				0	\$38.68	\$40.92	\$489.60
Lavatory Sinks	0				0	\$0.00	\$0.00	\$0.00
ECO1 TOTAL:	93,210		0	0	0	\$38.68	\$40.92	\$489.60
2	42,900				0	\$0.18	\$0.19	\$9.70
Misc. Sinks								
ECO2 TOTAL:	42,900		0	0	0	\$0.18	\$0.19	\$9.70
3	48,600					\$20.17	\$20.17	\$1,257.48
Water Closets								
ECO3 TOTAL:	48,600					\$20.17	\$20.17	\$1,257.48
4	24,570					\$10.20	\$10.20	\$127.30
Urinals								
ECO4 TOTAL:	24,570					\$10.20	\$10.20	\$127.30
5	0				0	\$0.00	\$0.00	\$0.00
Shower Heads								
ECO5 TOTAL:	0		0	0	0	\$0.00	\$0.00	\$0.00
6								
Equipment								
Related								
ECO6 TOTAL:	0		0	0	0	\$0.00	\$0.00	\$0.00

SYSTEMS CORP

Systems Engineering and Management Corporation, Knoxville, TN

FY94S EEAP FT. KNOX WATER CONSERVATION STUDY

1 2

DATE: 31 Oct 94

CALCULATION WORK SHEET 1

FUNCTION: Training Building

2426

10

Operating Hours:

58

FACILITY NO.:

Occupancy:

ECO Number ECO Type	Existing Fixture System		Retrofited Fixture System		Usage HRS/YR	Fixtures Quantity	Water Leaks Eliminated LPY
	Description	LPM	Description	LPM			
1	Public Lavatory	9.5	Spring Loaded Faucets	4.7	130	4	
Lavatory Sinks							
ECO1 TOTAL:		LPM		LPM		4	0
2							
Misc. Sinks							
ECO2 TOTAL:		LPM		LPM			
3	Floor Mounted Flush Valve	17	Install 3.5 GPF Flush Valve	13.2	4000	5	
Water Closets							
			Repair Kit				
ECO3 TOTAL:		LPM		LPM	#FL/YR	5	0
4	Wall Mounted Flush Valve	5.68	Install 1.0 GPF Flush Valve	3.79	20000	4	
Urinals							
			Repair Kit				
ECO4 TOTAL:		LPM		LPM	HRS/YR	4	0
5							
Shower Heads							
ECO5 TOTAL:		LPM		LPM		0	0
6							
Equipment Related							
ECO6 TOTAL:						0	0

SYSTEMS CORP

Systems Engineering and Management Corporation, Knoxville, TN

CALCULATION WORK SHEET 2

FACILITY NO.: 2426 Water Rate: 0.42 \$/KL Energy Rate: \$/KWH

Gas Rate: 10.51 \$/MWH Demand Rate: \$/KW

ECO Number	ECO Type	Annual Water		Annual Energy Saving			WATER		Total	
		Saving	LPY	ELEC KW	ELEC KWH	GAS MWH	Dollar Saving	Dollar Saving	Dollar Saving	Dollars Invested
1	Lavatory Sinks	186,420				0	\$77.36	\$81.84	\$979.20	
		0				0	\$0.00	\$0.00	\$0.00	
ECO1 TOTAL:		186,420		0	0	0	\$77.36	\$81.84	\$979.20	
2	Misc. Sinks	0				0	\$0.00	\$0.00	\$0.00	
ECO2 TOTAL:		0		0	0	0	\$0.00	\$0.00	\$0.00	
3	Water Closets	76,000					\$31.54	\$31.54	\$300.24	
ECO3 TOTAL:		76,000					\$31.54	\$31.54	\$300.24	
4	Urinals	151,200					\$62.75	\$62.75	\$254.59	
ECO4 TOTAL:		151,200					\$62.75	\$62.75	\$254.59	
5	Shower Heads	0				0	\$0.00	\$0.00	\$0.00	
ECO5 TOTAL:		0		0	0	0	\$0.00	\$0.00	\$0.00	
6	Equipment Related									
ECO6 TOTAL:		0		0	0	0	\$0.00	\$0.00	\$0.00	

SYSTEMS CORP

Systems Engineering and Management Corporation, Knoxville, TN

FY94S EEAP FT. KNOX WATER CONSERVATION STUDY

1 2

DATE: 31 Oct 94

CALCULATION WORK SHEET 1

Admin/Laundry

FUNCTION:

2608

FACILITY NO.:

8

Operating Hours:

5

Occupancy:

ECO Number ECO Type	Existing Fixture System		Retrofitted Fixture System		Usage HRS/YR	Fixtures Quantity	Water Leaks Eliminated LPY
	Description	LPM	Description	LPM			
1	Public Lavatory	13	Spring Loaded Faucets	4.7	130	2	
Lavatory Sinks							
ECO1 TOTAL:							
2	Service Sink	11	Install Aerators	9.5	130	1	0
Misc. Sinks	Laundry Sink	15	Install Aerators	9.5	130	1	
ECO2 TOTAL:							
3	Floor Mounted Flush Valve	17	Install 3.5 GPF Flush Valve	13.2	2080	2	0
Water Closets			Repair Kit				
ECO3 TOTAL:							
4							
Urinals							
ECO4 TOTAL:							
5							
Shower Heads							
ECO5 TOTAL:							
6							
Equipment							
Related							
ECO6 TOTAL:							
						0	0

SYSTEMS CORP

Systems Engineering and Management Corporation, Knoxville, TN

CALCULATION WORK SHEET 2

FACILITY NO. : 2608 Water Rate: 0.42 \$/KL Energy Rate: \$/KWH

Gas Rate: 10.51 \$/MWH Demand Rate: \$/KW

ECO Number	ECO Type	Annual Water		Annual Energy Saving			WATER		Total	
		Saving	LPY	ELEC KW	ELEC KWH	GAS MWH	Dollar Saving	Dollar Saving	Dollar Saving	Dollars Invested
1	Lavatory Sinks	147,810				0	\$61.34	\$64.89	\$64.89	\$489.60
		0				0	\$0.00	\$0.00	\$0.00	\$0.00
ECO1 TOTAL:		147,810		0	0	0	\$61.34	\$64.89	\$64.89	\$489.60
2	Misc. Sinks	11,700				0	\$0.05	\$0.05	\$0.05	\$9.70
		42,900				0	\$0.18	\$0.19	\$0.19	\$9.70
ECO2 TOTAL:		54,600		0	0	0	\$0.23	\$0.24	\$0.24	\$19.39
3	Water Closets	15,808					\$6.56	\$6.56	\$6.56	\$120.10
ECO3 TOTAL:		15,808					\$6.56	\$6.56	\$6.56	\$120.10
4	Urinals	0					\$0.00	\$0.00	\$0.00	\$0.00
ECO4 TOTAL:		0					\$0.00	\$0.00	\$0.00	\$0.00
5	Shower Heads	0				0	\$0.00	\$0.00	\$0.00	\$0.00
ECO5 TOTAL:		0		0	0	0	\$0.00	\$0.00	\$0.00	\$0.00
6	Equipment Related									
ECO6 TOTAL:		0		0	0	0	\$0.00	\$0.00	\$0.00	\$0.00

SYSTEMS CORP

Systems Engineering and Management Corporation, Knoxville, TN

FY94S EEAP FT. KNOX WATER CONSERVATION STUDY

1 of 2

CALCULATION WORK SHEET 1

DATE: 29 Oct 94

FACILITY NO.: 2723

FUNCTION: Dining

Occupancy: 2 Meals / Day

Operating Hours: 8am to 2 am

ECO Number ECO Type	Existing Fixture System		Retrofited Fixture System		Usage HRS/YR	Fixtures Quantity	Water Leaks Eliminated LPY
	Description	LPM	Description	LPM			
1	Lavatory Sinks	9.5	Spring Loaded Faucets	4.7	730	7	
ECO1 TOTAL:		LPM		LPM		7	0
2	Misc. Sinks						
ECO2 TOTAL:		LPM					
3	Floor Mounted Flush Valve	17	Install 3.5 GPF Flush Valve	13.2	10950	7	0
Water Closets			Repair Kit				
ECO3 TOTAL:		LPM					
4	Wall Mounted Flush Valve	5.68	Install 1.0 GPF Flush Valve	3.79	10950	3	0
Urinals			Repair Kit				
ECO4 TOTAL:		LPM					
5	Shower Heads						
ECO5 TOTAL:		LPM					
6	3 Comp. Sink (1 faucets)	22.7	Install Aerators	9.5	1075	1	0
Equipment Related	2 Comp. Sink (1 faucets)	17	Install Aerators	9.5	1075	2	
ECO6 TOTAL:						3	0

SYSTEMS CORP

Systems Engineering and Management Corporation, Knoxville, TN

CALCULATION WORK SHEET 2

FACILITY NO. : 2723 Water Rate: 0.42 \$/KL Energy Rate: \$/KWH

Gas Rate: 10.51 \$/MWH Demand Rate: \$/KW

ECO Number	ECO Type	Annual Water Saving LPY	Annual Energy Saving			WATER	Total	
			ELEC KW	ELEC KWH	GAS MWH		Dollar Saving	Dollars Invested
1	Lavatory Sinks	1,831,935			3	\$760.25	\$789.96	\$1,428.00
		0			0	\$0.00	\$0.00	\$0.00
		0			0	\$0.00	\$0.00	\$0.00
ECO1 TOTAL:		1,831,935	0	0	3	\$760.25	\$789.96	\$1,428.00
2	Misc. Sinks	0			0	\$0.00	\$0.00	\$0.00
		0			0	\$0.00	\$0.00	\$0.00
		0			0	\$0.00	\$0.00	\$0.00
ECO2 TOTAL:		0	0	0	0	\$0.00	\$0.00	\$0.00
3	Water Closets	291,270				\$120.88	\$120.88	\$350.28
		0				\$0.00	\$0.00	\$0.00
		0				\$0.00	\$0.00	\$0.00
ECO3 TOTAL:		291,270				\$120.88	\$120.88	\$350.28
4	Urinals	62,086				\$25.77	\$25.77	\$159.12
		0				\$0.00	\$0.00	\$0.00
		0				\$0.00	\$0.00	\$0.00
ECO4 TOTAL:		62,086				\$25.77	\$25.77	\$159.12
5	Shower Heads	0			0	\$0.00	\$0.00	\$0.00
		0			0	\$0.00	\$0.00	\$0.00
		0			0	\$0.00	\$0.00	\$0.00
ECO5 TOTAL:		0	0	0	0	\$0.00	\$0.00	\$0.00
6	Equipment Related	851,400			1	\$3.53	\$17.34	\$8.08
		967,500			1	\$4.02	\$19.70	\$16.16
		0			0	\$0.00	\$0.00	\$0.00
		0			0	\$0.00	\$0.00	\$0.00
		0			0	\$0.00	\$0.00	\$0.00
ECO6 TOTAL:		1,818,900	0	0	3	\$7.55	\$37.04	\$24.24

SYSTEMS CORP

Systems Engineering and Management Corporation, Knoxville, TN

FY94S EEAP FT. KNOX WATER CONSERVATION STUDY										1	2
CALCULATION WORK SHEET 1										DATE:	29 Oct 94
FACILITY NO. :		2764		FUNCTION:		Maintenance					
Occupancy:		10		Operating Hours:		8					
ECO Number	ECO Type	Existing Fixture System		Retrofited Fixture System		Usage	Fixtures	Water Leaks			
		Description	LPM	Description	LPM	HRS/YR	Quantity	Eliminated	LPY		
1	Lavatory Sinks										
ECO1 TOTAL:			LPM		LPM		0		0		
2	Misc. Sinks										
ECO2 TOTAL:											
3	Water Closets	Floor Mounted Flush Valve	17	Install 3.5 GPF Flush Valve	13.2	3000	2				
				Repair Kit							
ECO3 TOTAL:			LPM		LPM	#FL/YR	0		0		
4	Urinals	Wall Mounted Flush Valve	5.68	Install 1.0 GPF Flush Valve	3.79	18250	1				
				Repair Kit							
ECO4 TOTAL:			LPM		LPM	HRS/YR	1		0		
5	Shower Heads										
ECO5 TOTAL:			LPM		LPM		0		0		
6	Equipment Related										
ECO6 TOTAL:							0		0		

SYSTEMS CORP

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CALCULATION WORK SHEET 2

FACILITY NO. : 2764 Water Rate: 0.42 \$/KL Energy Rate: \$/KWH

Gas Rate: 10.51 \$/MWH Demand Rate: \$/KW

ECO Number ECO Type	Annual Water Saving LPY	Annual Energy Saving			WATER Dollar Saving	Total Dollar Saving	Total Dollars Invested
		ELEC KW	ELEC KWH	GAS MWH			
1 Lavatory Sinks	0			0	\$0.00	\$0.00	\$0.00
	0			0	\$0.00	\$0.00	\$0.00
	0			0	\$0.00	\$0.00	\$0.00
ECO1 TOTAL:	0	0	0	0	\$0.00	\$0.00	\$0.00
2 Misc. Sinks	0			0	\$0.00	\$0.00	\$0.00
	0			0	\$0.00	\$0.00	\$0.00
	0			0	\$0.00	\$0.00	\$0.00
ECO2 TOTAL:	0	0	0	0	\$0.00	\$0.00	\$0.00
3 Water Closets	22,800				\$9.46	\$9.46	\$120.10
	0				\$0.00	\$0.00	\$0.00
	0				\$0.00	\$0.00	\$0.00
ECO3 TOTAL:	22,800				\$9.46	\$9.46	\$120.10
4 Urinals	34,493				\$14.31	\$14.31	\$63.65
	0				\$0.00	\$0.00	\$0.00
	0				\$0.00	\$0.00	\$0.00
ECO4 TOTAL:	34,493				\$14.31	\$14.31	\$63.65
5 Shower Heads	0			0	\$0.00	\$0.00	\$0.00
	0			0	\$0.00	\$0.00	\$0.00
	0			0	\$0.00	\$0.00	\$0.00
ECO5 TOTAL:	0	0	0	0	\$0.00	\$0.00	\$0.00
6 Equipment Related	0			0	\$0.00	\$0.00	\$0.00
	0			0	\$0.00	\$0.00	\$0.00
	0			0	\$0.00	\$0.00	\$0.00
ECO6 TOTAL:	0	0	0	0	\$0.00	\$0.00	\$0.00

SYSTEMS CORP

Systems Engineering and Management Corporation, Knoxville, TN

FY94S EEAP FT. KNOX WATER CONSERVATION STUDY

1 2

CALCULATION WORK SHEET 1

DATE: 29 Oct 94

FACILITY NO. : 2770

FUNCTION: Maintenance

Occupancy: Operating Hours: 8

ECO Number ECO Type	Existing Fixture System Description	LPM	Retrofitted Fixture System Description	Usage HRS/YR	Fixtures Quantity	Water Leaks Eliminated LPY
1	Wash Fountain					39840
ECO1 TOTAL:		LPM			0	39840
2	Service Sink					39840
ECO2 TOTAL:		LPM				
3	Floor Mounted Flush Valve	17	Install 3.5 GPF Flush Valve	3000	12	
Water Closets			Repair Kit			
ECO3 TOTAL :		LPF		LPF #FL/YR	12	0
4	Wall Mounted Flush Valve	5.68	Install 1.0 GPF Flush Valve	18250	9	
Urinals			Repair Kit			
ECO4 TOTAL :		LPM		LPM HRS/YR	9	0
5						
Shower Heads						
ECO5 TOTAL :		LPM		LPM	0	0
6						
Equipment Related						
ECO6 TOTAL :					0	0

SYSTEMS CORP

Systems Engineering and Management Corporation, Knoxville, TN

CALCULATION WORK SHEET 2

FACILITY NO. : 2770 Water Rate: 0.42 \$/KL Energy Rate: \$/KWH

Gas Rate: 10.51 \$/MWH Demand Rate: \$/KW

ECO Number	ECO Type	Annual Water		Annual Energy Saving			WATER		Total	
		Saving	LPY	ELEC KW	ELEC KWH	GAS MWH	Dollar Saving	Dollar Saving	Dollar Saving	Dollars Invested
1	Lavatory Sinks	39,840				0	\$16.53	\$17.59	\$0.00	\$0.00
		0				0	\$0.00	\$0.00	\$0.00	\$0.00
		0				0	\$0.00	\$0.00	\$0.00	\$0.00
ECO1 TOTAL:		39,840		0	0	0	\$16.53	\$17.59	\$0.00	\$0.00
2	Misc. Sinks	39,840				0	\$0.17	\$1.12	\$0.00	\$0.00
		0				0	\$0.00	\$0.00	\$0.00	\$0.00
		0				0	\$0.00	\$0.00	\$0.00	\$0.00
ECO2 TOTAL:		39,840		0	0	0	\$0.17	\$1.12	\$0.00	\$0.00
3	Water Closets	136,800					\$56.77	\$56.77	\$720.58	\$0.00
		0					\$0.00	\$0.00	\$0.00	\$0.00
		0					\$0.00	\$0.00	\$0.00	\$0.00
ECO3 TOTAL:		136,800					\$56.77	\$56.77	\$720.58	\$0.00
4	Urinals	310,433					\$128.83	\$128.83	\$572.83	\$0.00
		0					\$0.00	\$0.00	\$0.00	\$0.00
		0					\$0.00	\$0.00	\$0.00	\$0.00
ECO4 TOTAL:		310,433					\$128.83	\$128.83	\$572.83	\$0.00
5	Shower Heads	0				0	\$0.00	\$0.00	\$0.00	\$0.00
		0				0	\$0.00	\$0.00	\$0.00	\$0.00
		0				0	\$0.00	\$0.00	\$0.00	\$0.00
ECO5 TOTAL:		0		0	0	0	\$0.00	\$0.00	\$0.00	\$0.00
6	Equipment Related	0				0	\$0.00	\$0.00	\$0.00	\$0.00
		0				0	\$0.00	\$0.00	\$0.00	\$0.00
		0				0	\$0.00	\$0.00	\$0.00	\$0.00
ECO6 TOTAL:		0		0	0	0	\$0.00	\$0.00	\$0.00	\$0.00

SYSTEMS CORP

Systems Engineering and Management Corporation, Knoxville, TN

FY94S EEAP FT. KNOX WATER CONSERVATION STUDY

1 2

DATE: 29 Oct 94

CALCULATION WORK SHEET 1

FUNCTION: Maintenance

FACILITY NO.: 2778

Operating Hours: 8

Occupancy: 40

ECO Number ECO Type	Existing Fixture System		Retrofited Fixture System		Usage HRS/YR	Fixtures Quantity	Water Leaks Eliminated LPY
	Description	LPM	Description	LPM			
1	Public Lavatory	9.5	Spring Loaded Faucets	4.7	730	5	
Lavatory Sinks							
ECO1 TOTAL:		LPM		LPM		5	0
2							0
Misc. Sinks							
ECO2 TOTAL:		LPM					
3	Floor Mounted Flush Valve	17	Install 3.5 GPF Flush Valve	13.2	3000	6	
Water Closets							
			Repair Kit				
ECO3 TOTAL:		LPM		LPM		6	0
4	Wall Mounted Flush Valve	5.68	Install 1.0 GPF Flush Valve	3.79	18250	3	
Urinals							
			Repair Kit				
ECO4 TOTAL:		LPM		LPM		3	0
5							0
Shower Heads							
ECO5 TOTAL:		LPM		LPM		0	0
6							
Equipment Related							
ECO6 TOTAL:						0	0

SYSTEMS CORP

Systems Engineering and Management Corporation, Knoxville, TN

CALCULATION WORK SHEET 2

FACILITY NO.: 2778
 Water Rate: 0.42 \$/KL Energy Rate: \$/KWH
 Gas Rate: 10.51 \$/MWH Demand Rate: \$/KW

ECO Number	Annual Water Saving LPY	Annual Energy Saving			WATER		Total	Total
ECO Type		ELEC KW	ELEC KWH	GAS MWH	Dollar Saving	Dollar Saving	Dollar Saving	Dollars Invested
1	1,308,525			3	\$543.04	\$577.62	\$577.62	\$1,224.00
Lavatory Sinks	0			0	\$0.00	\$0.00	\$0.00	\$0.00
	0			0	\$0.00	\$0.00	\$0.00	\$0.00
ECO1 TOTAL:	1,308,525	0	0	3	\$543.04	\$577.62	\$577.62	\$1,224.00
2	0			0	\$0.00	\$0.00	\$0.00	\$0.00
Misc. Sinks	0			0	\$0.00	\$0.00	\$0.00	\$0.00
	0			0	\$0.00	\$0.00	\$0.00	\$0.00
ECO2 TOTAL:	0	0	0	0	\$0.00	\$0.00	\$0.00	\$0.00
3	68,400				\$28.39	\$28.39	\$28.39	\$360.29
Water Closets	0				\$0.00	\$0.00	\$0.00	\$0.00
	0				\$0.00	\$0.00	\$0.00	\$0.00
ECO3 TOTAL:	68,400				\$28.39	\$28.39	\$28.39	\$360.29
4	103,477				\$42.94	\$42.94	\$42.94	\$190.94
Urinals	0				\$0.00	\$0.00	\$0.00	\$0.00
	0				\$0.00	\$0.00	\$0.00	\$0.00
ECO4 TOTAL:	103,477				\$42.94	\$42.94	\$42.94	\$190.94
5	0			0	\$0.00	\$0.00	\$0.00	\$0.00
Shower Heads	0			0	\$0.00	\$0.00	\$0.00	\$0.00
	0			0	\$0.00	\$0.00	\$0.00	\$0.00
ECO5 TOTAL:	0	0	0	0	\$0.00	\$0.00	\$0.00	\$0.00
6	0			0	\$0.00	\$0.00	\$0.00	\$0.00
Equipment Related	0			0	\$0.00	\$0.00	\$0.00	\$0.00
	0			0	\$0.00	\$0.00	\$0.00	\$0.00
	0			0	\$0.00	\$0.00	\$0.00	\$0.00
ECO6 TOTAL:	0	0	0	0	\$0.00	\$0.00	\$0.00	\$0.00

SYSTEMS CORP

Systems Engineering and Management Corporation, Knoxville, TN

FY94S EEAP FT. KNOX WATER CONSERVATION STUDY

1 2

CALCULATION WORK SHEET 1

DATE: 29 Oct 94

FACILITY NO.: 2943

FUNCTION: Maintenance

Occupancy: 15

Operating Hours: 8

ECO Number ECO Type	Existing Fixture System		Retrofitted Fixture System		Usage HRS/YR	Fixtures Quantity	Water Leaks Eliminated LPY
	Description	LPM	Description	LPM			
1	Public Lavatory	19	Spring Loaded Faucets	4.7	730	3	55780
Lavatory Sinks							
ECO1 TOTAL:		LPM		LPM		3	55780
2							0
Misc. Sinks							
ECO2 TOTAL:		LPF		LPF	#FL/YR	0	0
3	Floor Mounted Flush Valve	17	Install 3.5 GPF Flush Valve	13.2	3000	3	
Water Closets							
			Repair Kit				
ECO3 TOTAL:		LPF		LPF	#FL/YR	3	0
4	Wall Mounted Flush Valve	5.68	Install 1.0 GPF Flush Valve	3.79	18250	1	
Urinals							
			Repair Kit				
ECO4 TOTAL:		LPM		LPM	HRS/YR	1	0
5							0
Shower Heads							
ECO5 TOTAL:		LPM		LPM		0	0
6							
Equipment Related							
ECO6 TOTAL:						0	0

SYSTEMS CORP

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CALCULATION WORK SHEET 2

FACILITY NO.: 2943 Water Rate: 0.42 \$/KL Energy Rate: \$/KWH
 Gas Rate: 10.51 \$/MWH Demand Rate: \$/KW

ECO Number	Annual Water Saving LPY	Annual Energy Saving		WATER		Total	Total
ECO Type		ELEC KW	ELEC KWH	Dollar Saving	Dollar Saving	Dollars Invested	
1							
Lavatory Sinks	2,089,195		5	\$867.02	\$922.23	\$734.40	
	0		0	\$0.00	\$0.00	\$0.00	
	0		0	\$0.00	\$0.00	\$0.00	
ECO1 TOTAL:	2,089,195	0	5	\$867.02	\$922.23	\$734.40	
2							
Misc. Sinks	0		0	\$0.00	\$0.00	\$0.00	
	0		0	\$0.00	\$0.00	\$0.00	
ECO2 TOTAL:	0	0	0	\$0.00	\$0.00	\$0.00	
3							
Water Closets	34,200			\$14.19	\$14.19	\$180.14	
	0			\$0.00	\$0.00	\$0.00	
	0			\$0.00	\$0.00	\$0.00	
ECO3 TOTAL:	34,200			\$14.19	\$14.19	\$180.14	
4							
Urinals	34,493			\$14.31	\$14.31	\$63.65	
	0			\$0.00	\$0.00	\$0.00	
	0			\$0.00	\$0.00	\$0.00	
ECO4 TOTAL:	34,493			\$14.31	\$14.31	\$63.65	
5							
Shower Heads	0		0	\$0.00	\$0.00	\$0.00	
	0		0	\$0.00	\$0.00	\$0.00	
	0		0	\$0.00	\$0.00	\$0.00	
ECO5 TOTAL:	0	0	0	\$0.00	\$0.00	\$0.00	
6							
Equipment Related	0		0	\$0.00	\$0.00	\$0.00	
	0		0	\$0.00	\$0.00	\$0.00	
	0		0	\$0.00	\$0.00	\$0.00	
ECO6 TOTAL:	0	0	0	\$0.00	\$0.00	\$0.00	

SYSTEMS CORP

Systems Engineering and Management Corporation, Knoxville, TN

FY94S EEAP FT. KNOX WATER CONSERVATION STUDY										1	2
CALCULATION WORK SHEET 1										DATE:	29 Oct 94
FACILITY NO. : 2955		FUNCTION: Maintenance									
Occupancy: 8		Operating Hours: 8									
ECO Number ECO Type	Existing Fixture System Description	LPM	Retrofitted Fixture System Description	LPM	Usage HRS/YR	Fixtures Quantity	Water Leaks Eliminated LPY				
1	Lavatory Sinks										
ECO1 TOTAL:		LPM		LPM		0	0				
2	Misc. Sinks										
ECO2 TOTAL:											
3	Floor Mounted Flush Valve	LPF	Install 3.5 GPF Flush Valve	13.2	3000	2					
	Water Closets		Repair Kit								
ECO3 TOTAL:		LPF		LPF	#FL/YR	0	0				
4	Wall Mounted Flush Valve	5.68	Install 1.0 GPF Flush Valve	3.79	18250	1					
	Urinals		Repair Kit								
ECO4 TOTAL:		LPM		LPM	HRS/YR	1	0				
5	Shower Heads						0				
ECO5 TOTAL:		LPM		LPM		0	0				
6	Equipment Related										
ECO6 TOTAL:						0	0				

CALCULATION WORK SHEET 2

FACILITY NO. : 2955 Water Rate: 0.42 \$/KL Energy Rate: \$/KWH

Gas Rate: 10.51 \$/MWH Demand Rate: \$/KW

ECO Number ECO Type	Annual Water Saving LPY	Annual Energy Saving			WATER		Total	
		ELEC KW	ELEC KWH	GAS MWH	Dollar Saving	Dollar Saving	Dollar Saving	Dollars Invested
1 Lavatory Sinks	0			0	\$0.00	\$0.00	\$0.00	\$0.00
	0			0	\$0.00	\$0.00	\$0.00	\$0.00
	0			0	\$0.00	\$0.00	\$0.00	\$0.00
ECO1 TOTAL:	0	0	0	0	\$0.00	\$0.00	\$0.00	\$0.00
2 Misc. Sinks	0			0	\$0.00	\$0.00	\$0.00	\$0.00
	0			0	\$0.00	\$0.00	\$0.00	\$0.00
	0			0	\$0.00	\$0.00	\$0.00	\$0.00
ECO2 TOTAL:	0	0	0	0	\$0.00	\$0.00	\$0.00	\$0.00
3 Water Closets	22,800				\$9.46	\$9.46	\$9.46	\$120.10
	0				\$0.00	\$0.00	\$0.00	\$0.00
	0				\$0.00	\$0.00	\$0.00	\$0.00
ECO3 TOTAL:	22,800				\$9.46	\$9.46	\$9.46	\$120.10
4 Urinals	34,493				\$14.31	\$14.31	\$14.31	\$63.65
	0				\$0.00	\$0.00	\$0.00	\$0.00
	0				\$0.00	\$0.00	\$0.00	\$0.00
ECO4 TOTAL:	34,493				\$14.31	\$14.31	\$14.31	\$63.65
5 Shower Heads	0			0	\$0.00	\$0.00	\$0.00	\$0.00
	0			0	\$0.00	\$0.00	\$0.00	\$0.00
	0			0	\$0.00	\$0.00	\$0.00	\$0.00
ECO5 TOTAL:	0	0	0	0	\$0.00	\$0.00	\$0.00	\$0.00
6 Equipment Related	0			0	\$0.00	\$0.00	\$0.00	\$0.00
	0			0	\$0.00	\$0.00	\$0.00	\$0.00
	0			0	\$0.00	\$0.00	\$0.00	\$0.00
ECO6 TOTAL:	0	0	0	0	\$0.00	\$0.00	\$0.00	\$0.00

SYSTEMS CORP

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FY94S EEAP FT. KNOX WATER CONSERVATION STUDY										1	2
CALCULATION WORK SHEET 1										DATE:	29 Oct 94
FACILITY NO. :		2958		FUNCTION:		Maintenance					
Occupancy:		30		Operating Hours:		8					
ECO Number	ECO Type	Existing Fixture System	Description	LPM	Retrofitted Fixture System	Description	LPM	Usage HRS/YR	Fixtures Quantity	Water Leaks Eliminated LPY	
1	Lavatory Sinks										
ECO1 TOTAL:											
2	Misc. Sinks										
ECO2 TOTAL:											
3	Water Closets										
ECO3 TOTAL:											
4	Urinals										
ECO4 TOTAL:											
5	Shower Heads										
ECO5 TOTAL:											
6	Equipment Related										
ECO6 TOTAL:											

CALCULATION WORK SHEET 2

FACILITY NO.: 2958
 Water Rate: 0.42 \$/KL Energy Rate: \$/KWH
 Gas Rate: 10.51 \$/MWH Demand Rate: \$/KW

ECO Number	Annual Water Saving	Annual Water LPY	Annual Energy Saving			WATER	Total	Total
			ELEC KW	ELEC KWH	GAS MWH			
ECO1 TOTAL:	0	0	0	0	0	\$0.00	\$0.00	\$0.00
Lavatory Sinks	0				0	\$0.00	\$0.00	\$0.00
	0				0	\$0.00	\$0.00	\$0.00
	0				0	\$0.00	\$0.00	\$0.00
ECO2 TOTAL:	0	0	0	0	0	\$0.00	\$0.00	\$0.00
Misc. Sinks	240,900				1	\$1.00	\$6.79	\$9.70
	0				0	\$0.00	\$0.00	\$0.00
	0				0	\$0.00	\$0.00	\$0.00
ECO3 TOTAL:	240,900	0	0	0	1	\$1.00	\$6.79	\$9.70
Water Closets	34,200					\$14.19	\$14.19	\$180.14
	0					\$0.00	\$0.00	\$0.00
	0					\$0.00	\$0.00	\$0.00
ECO4 TOTAL:	34,200					\$14.19	\$14.19	\$180.14
Urinals	68,985					\$28.63	\$28.63	\$127.30
	0					\$0.00	\$0.00	\$0.00
	0					\$0.00	\$0.00	\$0.00
ECO5 TOTAL:	68,985					\$28.63	\$28.63	\$127.30
Shower Heads	0				0	\$0.00	\$0.00	\$0.00
	0				0	\$0.00	\$0.00	\$0.00
	0				0	\$0.00	\$0.00	\$0.00
ECO6 TOTAL:	0	0	0	0	0	\$0.00	\$0.00	\$0.00
Equipment Related	0				0	\$0.00	\$0.00	\$0.00
	0				0	\$0.00	\$0.00	\$0.00
	0				0	\$0.00	\$0.00	\$0.00
ECO7 TOTAL:	0				0	\$0.00	\$0.00	\$0.00

SYSTEMS CORP

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FY94S EEAP FT. KNOX WATER CONSERVATION STUDY										1	2
CALCULATION WORK SHEET 1										DATE:	31 Oct 94
FACILITY NO. :		4014		FUNCTION:		Snack Bar					
Occupancy:		<u>Varies</u>		Operating Hours:		13					
ECO Number ECO Type	Existing Fixture System		Retrofitted Fixture System		Usage HRS/YR	Fixtures Quantity	Water Leaks Eliminated LPY				
	Description	LPM	Description	LPM							
1	Public Lavatory	9.5	Spring Loaded Faucets and Mixing Valve	4.7	365	3					
ECO1 TOTAL:											
2		LPM		LPM		3	0				
Misc. Sinks											
ECO2 TOTAL:											
3	Floor Mounted Flush Valve	17	Install 3.5 GPF Flush Valve	13.2	1300	2	0				
Water Closets											
ECO3 TOTAL :											
4	Wall Mounted Flush Valve	5.68	Install 1.0 GPF Flush Valve	3.79	1300	1	0				
Urinals											
ECO4 TOTAL :											
5											
Shower Heads											
ECO5 TOTAL :											
6		LPM		LPM		0	0				
Equipment Related											
ECO6 TOTAL :											
						0	0				

CALCULATION WORK SHEET 2

FACILITY NO.: 4014 Water Rate: 0.42 \$/KL Energy Rate: \$/KWH

Gas Rate: 10.51 \$/MWH Demand Rate: \$/KW

ECO Number ECO Type	Annual Water Saving LPY	Annual Energy Saving			WATER Dollar Saving	Total Dollar Saving	Total Dollars Invested
		ELEC KW	ELEC KWH	GAS MWH			
1 Lavatory Sinks	392,558			1	\$162.91	\$172.34	\$734.40
ECO1 TOTAL:	392,558	0	0	1	\$162.91	\$172.34	\$734.40
2 Misc. Sinks	0			0	\$0.00	\$0.00	\$0.00
ECO2 TOTAL:	0	0	0	0	\$0.00	\$0.00	\$0.00
3 Water Closets	9,880				\$4.10	\$4.10	\$120.10
ECO3 TOTAL:	9,880				\$4.10	\$4.10	\$120.10
4 Urinals	2,457				\$1.02	\$1.02	\$63.65
ECO4 TOTAL:	2,457				\$1.02	\$1.02	\$63.65
5 Shower Heads	0			0	\$0.00	\$0.00	\$0.00
ECO5 TOTAL:	0	0	0	0	\$0.00	\$0.00	\$0.00
6 Equipment Related							
ECO6 TOTAL:	0	0	0	0	\$0.00	\$0.00	\$0.00

SYSTEMS CORP

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FY94S EEAP FT. KNOX WATER CONSERVATION STUDY

1 2

CALCULATION WORK SHEET 1

DATE: 31 Oct 94

FACILITY NO. : 4250

FUNCTION:

Occupancy:

8

Operating Hours:

ECO Number ECO Type	Existing Fixture System		Retrofited Fixture System		Usage HRS/YR	Fixtures Quantity	Water Leaks Eliminated LPY
	Description	LPM	Description	LPM			
1	Public Lavatory	9.5	Spring Loaded Faucets	4.7	130	24	
Lavatory Sinks							
ECO1 TOTAL:		LPM		LPM		24	0
2	Kitchen Sink	30	Install Aerators	9.5	130	3	
Misc. Sinks	Service Sink	30	Install Aerators	9.5	130	1	
ECO2 TOTAL:		LPF		LPF	#FL/YR	4	0
3	Floor Mounted Flush Valve	17	Install 3.5 GPF Flush Valve	13.2	1300	26	
Water Closets			Repair Kit				
ECO3 TOTAL :		LPF		LPF	#FL/YR	26	0
4							
Urinals							
ECO4 TOTAL :		LPM		LPM	HRS/YR	0	0
5							
Shower Heads							
ECO5 TOTAL :		LPM		LPM		0	0
6							
Equipment Related							
ECO6 TOTAL :						0	0

SYSTEMS CORP

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CALCULATION WORK SHEET 2

FACILITY NO.: 4250
 Water Rate: 0.42 \$/KL Energy Rate: \$/KWH
 Gas Rate: 10.51 \$/MWH Demand Rate: \$/KW

ECO Number	Annual Water Saving	LPY	Annual Energy Saving			WATER		Total	Total
ECO Type			ELEC KW	ELEC KWH	GAS MWH	Dollar Saving	Dollar Saving	Dollar Saving	Dollars Invested
1 Lavatory Sinks	1,118,520	0			3	\$464.19	\$491.06	\$5,875.20	\$0.00
ECO1 TOTAL:	1,118,520		0	0	3	\$464.19	\$491.06	\$5,875.20	
2 Misc. Sinks	479,700				1	\$1.99	\$2.11	\$29.09	\$0.00
	159,900				0	\$0.66	\$0.70	\$9.70	
ECO2 TOTAL:	639,600		0	0	1	\$2.65	\$2.81	\$38.78	
3 Water Closets	128,440					\$53.30	\$53.30	\$1,561.25	
ECO3 TOTAL:	128,440					\$53.30	\$53.30	\$1,561.25	
4 Urinals	0					\$0.00	\$0.00	\$0.00	
ECO4 TOTAL:	0					\$0.00	\$0.00	\$0.00	
5 Shower Heads	0				0	\$0.00	\$0.00	\$0.00	
ECO5 TOTAL:	0		0	0	0	\$0.00	\$0.00	\$0.00	
6 Equipment Related									
ECO6 TOTAL:	0		0	0	0	\$0.00	\$0.00	\$0.00	

SYSTEMS CORP

Systems Engineering and Management Corporation, Knoxville, TN

FY94S EEAP FT. KNOX WATER CONSERVATION STUDY

CALCULATION WORK SHEET 1

DATE: 31 Oct 94

FACILITY NO.: 4548

FUNCTION:

Lavatory Building

Occupancy:

Operating Hours:

24

ECO Number ECO Type	Existing Fixture System		Retrofited Fixture System		Usage HRS/YR	Fixtures Quantity	Water Leaks Eliminated LPY
	Description	LPM	Description	LPM			
1	Public Lavatory	9.5	Spring Loaded Faucets	4.7	130	4	
Lavatory Sinks							
ECO1 TOTAL:		LPM		LPM		4	0
2							
Misc. Sinks							
ECO2 TOTAL:		LPM		LPM			
3	Floor Mounted Flush Valve	17	Install 3.5 GPF Flush Valve	13.2	1300	5	
Water Closets							
ECO3 TOTAL:		LPM		LPM		5	0
4	Wall Mounted Flush Valve	5.68	Install 1.0 GPF Flush Valve	3.79	1300	2	
Urinals							
ECO4 TOTAL:		LPM		LPM		2	0
5							
Shower Heads							
ECO5 TOTAL:		LPM		LPM		0	0
6							
Equipment Related							
ECO6 TOTAL:						0	0

SYSTEMS CORP

Systems Engineering and Management Corporation, Knoxville, TN

CALCULATION WORK SHEET 2

FACILITY NO.: 4548
 Water Rate: 0.42 \$/KL Energy Rate: \$/KWH
 Gas Rate: 10.51 \$/MWH Demand Rate: \$/KW

ECO Number	Annual Water Saving LPY	Annual Energy Saving			WATER	Total	Total
ECO Type		ELEC KW	ELEC KWH	GAS MWH	Dollar Saving	Dollar Saving	Dollars Invested
1 Lavatory Sinks	186,420 0			0 0	\$77.36 \$0.00	\$81.84 \$0.00	\$979.20 \$0.00
ECO1 TOTAL:	186,420	0	0	0	\$77.36	\$81.84	\$979.20
2 Misc. Sinks	0			0	\$0.00	\$0.00	\$0.00
ECO2 TOTAL:	0	0	0	0	\$0.00	\$0.00	\$0.00
3 Water Closets	24,700				\$10.25	\$10.25	\$300.24
ECO3 TOTAL:	24,700				\$10.25	\$10.25	\$300.24
4 Urinals	4,914				\$2.04	\$2.04	\$127.30
ECO4 TOTAL:	4,914				\$2.04	\$2.04	\$127.30
5 Shower Heads	0			0	\$0.00	\$0.00	\$0.00
ECO5 TOTAL:	0	0	0	0	\$0.00	\$0.00	\$0.00
6 Equipment Related							
ECO6 TOTAL:	0	0	0	0	\$0.00	\$0.00	\$0.00

SYSTEMS CORP

Systems Engineering and Management Corporation, Knoxville, TN

FY94S EEAP FT. KNOX WATER CONSERVATION STUDY

Page 2

CALCULATION WORK SHEET 1

DATE: 29 Oct 94

FACILITY NO.: 4555

FUNCTION: NCO Club

Occupancy: 1 Meals / Day

Operating Hours:

ECO Number ECO Type	Existing Fixture System		Retrofited Fixture System		Usage HRS/YR	Fixtures Quantity	Water Leaks Eliminated LPY
	Description	LPM	Description	LPM			
1	Dual Faucets	9.5	Spring Loaded Faucets	4.7	730	22	
Lavatory Sinks							
ECO1 TOTAL:		LPM		LPM		22	0
2							
Misc. Sinks							
ECO2 TOTAL:		LPM		LPM			
3	Floor Mounted Flush Valve	17	Install 3.5 GPF Flush Valve	13.2	3650	21	
Water Closets							
			Repair Kit				
ECO3 TOTAL:		LPM		LPM		21	0
4	Wall Mounted Flush Valve	5.68	Install 1.0 GPF Flush Valve	3.79	3650	7	
Urinals							
			Repair Kit				
ECO4 TOTAL:		LPM		LPM		7	0
5							
Shower Heads							
ECO5 TOTAL:		LPM		LPM		0	0
6	2 Comp. Sink (2 faucets)	17	Install Aerators	9.5	730	1	
Equipment							
	1 Comp. Sink (1 faucets)	17	Install Aerators	9.5	730	3	
Related							
ECO6 TOTAL:						4	0

SYSTEMS CORP

Systems Engineering and Management Corporation, Knoxville, TN

CALCULATION WORK SHEET 2

FACILITY NO.: 4555
 Water Rate: 0.42 \$/KL Energy Rate: \$/KWH
 Gas Rate: 10.51 \$/MWH Demand Rate: \$/KW

ECO Number	Annual Water Saving LPY	Annual Energy Saving			WATER	Total	Total
ECO Type		ELEC KW	ELEC KWH	GAS MWH	Dollar Saving	Dollar Saving	Dollars Invested
1	5,757,510			9	\$2,389.37	\$2,482.73	\$4,488.00
Lavatory Sinks	0			0	\$0.00	\$0.00	\$0.00
	0			0	\$0.00	\$0.00	\$0.00
ECO1 TOTAL:	5,757,510	0	0	9	\$2,389.37	\$2,482.73	\$4,488.00
2	0			0	\$0.00	\$0.00	\$0.00
Misc. Sinks	0			0	\$0.00	\$0.00	\$0.00
	0			0	\$0.00	\$0.00	\$0.00
ECO2 TOTAL:	0	0	0	0	\$0.00	\$0.00	\$0.00
3	291,270				\$120.88	\$120.88	\$1,050.84
Water Closets	0				\$0.00	\$0.00	\$0.00
	0				\$0.00	\$0.00	\$0.00
ECO3 TOTAL:	291,270				\$120.88	\$120.88	\$1,050.84
4	48,290				\$20.04	\$20.04	\$371.28
Urinals	0				\$0.00	\$0.00	\$0.00
	0				\$0.00	\$0.00	\$0.00
ECO4 TOTAL:	48,290				\$20.04	\$20.04	\$371.28
5	0			0	\$0.00	\$0.00	\$0.00
Shower Heads	0			0	\$0.00	\$0.00	\$0.00
	0			0	\$0.00	\$0.00	\$0.00
ECO5 TOTAL:	0	0	0	0	\$0.00	\$0.00	\$0.00
6	328,500			1	\$1.36	\$6.69	\$8.08
Equipment	985,500			2	\$4.09	\$20.07	\$24.24
Related	0			0	\$0.00	\$0.00	\$0.00
	0			0	\$0.00	\$0.00	\$0.00
	0			0	\$0.00	\$0.00	\$0.00
ECO6 TOTAL:	1,314,000	0	0	2	\$5.45	\$26.76	\$32.32

SYSTEMS CORP

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FY94S EEAP FT. KNOX WATER CONSERVATION STUDY										1	2
CALCULATION WORK SHEET 1										DATE:	31 Oct 94
FACILITY NO. :		4769		FUNCTION:		Chapel					
Occupancy:		Operating Hours:									
ECO Number	ECO Type	Existing Fixture System		Retrofitted Fixture System		Usage	Fixtures	Water Leaks			
		Description	LPM	Description	LPM	HRS/YR	Quantity	Eliminated LPY			
1	Lavatory Sinks	Public Lavatory	9.5	Spring Loaded Faucets	4.7	130	4				
ECO1 TOTAL:	2		LPM		LPM		4	0			
Misc. Sinks											
ECO2 TOTAL:	3		LPF		LPF	#FL/YR	0	0			
	Water Closets	Floor Mounted Flush Valve	17	Install 3.5 GPF Flush Valve	13.2	1300	5				
				Repair Kit							
ECO3 TOTAL :	4		LPF		LPF	#FL/YR	5	0			
Urinals											
ECO4 TOTAL :	5		LPM		LPM	HRS/YR	0	0			
	Shower Heads										
ECO5 TOTAL :	6		LPM		LPM		0	0			
Equipment Related											
ECO6 TOTAL :							0	0			

CALCULATION WORK SHEET 2

FACILITY NO.: 4769
 Water Rate: 0.42 \$/KL Energy Rate: \$/KWH
 Gas Rate: 10.51 \$/MWH Demand Rate: \$/KW

ECO Number	ECO Type	Annual Water		Annual Energy Saving			WATER		Total	
		Saving	LPY	ELEC KW	ELEC KWH	GAS MWH	Dollar Saving	Dollar Saving	Dollar Saving	Dollars Invested
1	Lavatory Sinks	186,420				0	\$77.36	\$81.84	\$979.20	
		0				0	\$0.00	\$0.00	\$0.00	
ECO1 TOTAL:		186,420		0	0	0	\$77.36	\$81.84	\$979.20	
2	Misc. Sinks					0	\$0.00	\$0.00	\$0.00	
ECO2 TOTAL:		0		0	0	0	\$0.00	\$0.00	\$0.00	
3	Water Closets	24,700					\$10.25	\$10.25	\$300.24	
ECO3 TOTAL:		24,700					\$10.25	\$10.25	\$300.24	
4	Urinals	0					\$0.00	\$0.00	\$0.00	
ECO4 TOTAL:		0					\$0.00	\$0.00	\$0.00	
5	Shower Heads	0				0	\$0.00	\$0.00	\$0.00	
ECO5 TOTAL:		0		0	0	0	\$0.00	\$0.00	\$0.00	
6	Equipment Related									
ECO6 TOTAL:		0		0	0	0	\$0.00	\$0.00	\$0.00	

SYSTEMS CORP

Systems Engineering and Management Corporation, Knoxville, TN

FY94S EEAP FT. KNOX WATER CONSERVATION STUDY										10	2
CALCULATION WORK SHEET 1										DATE:	31 Oct 94
FACILITY NO. :		5217		FUNCTION:		Training Building					
Occupancy:		6		Operating Hours:		8					
ECO Number	ECO Type	Existing Fixture System		Retrofited Fixture System		Usage	Fixtures	Water Leaks			
		Description	LPM	Description	LPM	HRS/YR	Quantity	Eliminated LPY			
1	Lavatory Sinks	Public Lavatory	5.7	Spring Loaded Faucets	4.7	130	4				
ECO1 TOTAL:	2		LPM		LPM		4	0			
	Misc. Sinks										
ECO2 TOTAL:	3		LPF		LPF	#FL/YR	0	0			
	Water Closets	Floor Mounted Flush Valve	17	Install 3.5 GPF Flush Valve	13.2	1300	4				
				Repair Kit							
ECO3 TOTAL:	4		LPF		LPF	#FL/YR	4	0			
	Urinals	Wall Mounted Flush Valve	5.68	Install 1.0 GPF Flush Valve	3.79	4400	2				
				Repair Kit							
ECO4 TOTAL:	5		LPM		LPM	HRS/YR	2	0			
	Shower Heads										
ECO5 TOTAL:	6		LPM		LPM		0	0			
	Equipment Related										
ECO6 TOTAL:							0	0			

CALCULATION WORK SHEET 2

FACILITY NO. : 5217 Water Rate: 0.42 \$/KL Energy Rate: \$/KWH

Gas Rate: 10.51 \$/MWH Demand Rate: \$/KW

ECO Number	Annual Water		Annual Energy Saving			WATER	Total	Total
	Saving	LPY	ELEC KW	ELEC KWH	GAS MWH			
1	67,860				0	\$28.16	\$29.79	\$979.20
Lavatory Sinks	0				0	\$0.00	\$0.00	\$0.00
ECO1 TOTAL:	67,860	0	0	0	0	\$28.16	\$29.79	\$979.20
2	0				0	\$0.00	\$0.00	\$0.00
Misc. Sinks								
ECO2 TOTAL:	0	0	0	0	0	\$0.00	\$0.00	\$0.00
3	19,760					\$8.20	\$8.20	\$240.19
Water Closets								
ECO3 TOTAL:	19,760					\$8.20	\$8.20	\$240.19
4	16,632					\$6.90	\$6.90	\$127.30
Urinals								
ECO4 TOTAL:	16,632					\$6.90	\$6.90	\$127.30
5	0				0	\$0.00	\$0.00	\$0.00
Shower Heads								
ECO5 TOTAL:	0	0	0	0	0	\$0.00	\$0.00	\$0.00
6								
Equipment Related								
ECO6 TOTAL:	0	0	0	0	0	\$0.00	\$0.00	\$0.00

SYSTEMS CORP

Systems Engineering and Management Corporation, Knoxville, TN

FY94S EEAP FT. KNOX WATER CONSERVATION STUDY

Page 2

CALCULATION WORK SHEET 1

DATE: 29 Oct 94

FACILITY NO.: 5220

FUNCTION:

Maintenance

Occupancy:

Operating Hours:

8

ECO Number ECO Type	Existing Fixture System		Retrofited Fixture System		Usage HRS/YR	Fixtures Quantity	Water Leaks Eliminated LPY
	Description	LPM	Description	LPM			
1	Public Lavatory	26.5	Spring Loaded Faucets	26.5	730	3	
Lavatory Sinks							
ECO1 TOTAL:		LPM		LPM		3	0
2							
Misc. Sinks							
ECO2 TOTAL:		LPM					
3	Floor Mounted Flush Valve	17	Install 3.5 GPF Flush Valve	13.2	3000	5	
Water Closets							
			Repair Kit				
ECO3 TOTAL:		LPM					
4	Wall Mounted Flush Valve	5.68	Install 1.0 GPF Flush Valve	3.79	18250	3	
Urinals							
			Repair Kit				
ECO4 TOTAL:		LPM					
5							
Shower Heads							
ECO5 TOTAL:		LPM					
6							
Equipment Related							
ECO6 TOTAL:						0	0

SYSTEMS CORP

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CALCULATION WORK SHEET 2

FACILITY NO. : 5220
 Water Rate: 0.42 \$/KL Energy Rate: \$/KWH
 Gas Rate: 10.51 \$/MWH Demand Rate: \$/KW

ECO Number	Annual Water Saving LPY	Annual Energy Saving			WATER		Total	
		ELEC KW	ELEC KWH	GAS MWH	Dollar Saving	Dollar Saving	Dollar Saving	Dollars Invested
1	870,525			2	\$361.27	\$384.27		\$734.40
Lavatory Sinks	0			0	\$0.00	\$0.00		\$0.00
	0			0	\$0.00	\$0.00		\$0.00
ECO1 TOTAL:	870,525	0	0	2	\$361.27	\$384.27		\$734.40
2	0			0	\$0.00	\$0.00		\$0.00
Misc. Sinks	0			0	\$0.00	\$0.00		\$0.00
	0			0	\$0.00	\$0.00		\$0.00
ECO2 TOTAL:	0	0	0	0	\$0.00	\$0.00		\$0.00
3	57,000				\$23.66	\$23.66		\$300.24
Water Closets	0				\$0.00	\$0.00		\$0.00
	0				\$0.00	\$0.00		\$0.00
ECO3 TOTAL:	57,000				\$23.66	\$23.66		\$300.24
4	103,477				\$42.94	\$42.94		\$190.94
Urinals	0				\$0.00	\$0.00		\$0.00
	0				\$0.00	\$0.00		\$0.00
ECO4 TOTAL:	103,477				\$42.94	\$42.94		\$190.94
5	0			0	\$0.00	\$0.00		\$0.00
Shower Heads	0			0	\$0.00	\$0.00		\$0.00
	0			0	\$0.00	\$0.00		\$0.00
ECO5 TOTAL:	0	0	0	0	\$0.00	\$0.00		\$0.00
6	0			0	\$0.00	\$0.00		\$0.00
Equipment Related	0			0	\$0.00	\$0.00		\$0.00
	0			0	\$0.00	\$0.00		\$0.00
	0			0	\$0.00	\$0.00		\$0.00
ECO6 TOTAL:	0	0	0	0	\$0.00	\$0.00		\$0.00

SYSTEMS CORP

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FY94S EEAP FT. KNOX WATER CONSERVATION STUDY

1 2

CALCULATION WORK SHEET 1

DATE: 31 Oct 94

FACILITY NO. : 5223

FUNCTION: Fire Department

Operating Hours: 24

6

ECO Number ECO Type	Existing Fixture System		Retrofited Fixture System		Usage HRS/YR	Fixtures Quantity	Water Leaks Eliminated LPY
	Description	LPM	Description	LPM			
1	Public Lavatory	17	Spring Loaded Faucets	4.7	130	3	
Lavatory Sinks							
ECO1 TOTAL:		LPM		LPM		3	0
2							
Misc. Sinks							
ECO2 TOTAL:		LPM		LPM		0	0
3	Floor Mounted Flush Valve	17	Install 3.5 GPF Flush Valve	13.2	3285	2	
Water Closets							
ECO3 TOTAL:		LPM		LPM		2	0
4	Wall Mounted Flush Valve	5.68	Install 1.0 GPF Flush Valve	3.79	6570	1	
Urinals							
ECO4 TOTAL:		LPM		LPM		1	0
5							
Shower Heads							
ECO5 TOTAL:		LPM		LPM		0	0
6							
Equipment Related							
ECO6 TOTAL:						0	0

SYSTEMS CORP

Systems Engineering and Management Corporation, Knoxville, TN

FY94S EEAP FT. KNOX WATER CONSERVATION STUDY

2 OF 2

CALCULATION WORK SHEET 2

FACILITY NO. : 5223 Water Rate: 0.42 \$/KL Energy Rate: \$/KWH
 Gas Rate: 10.51 \$/MWH Demand Rate: \$/KW

ECO Number	ECO Type	Annual Water		Annual Energy Saving			WATER		Total	
		Saving	LPY	ELEC KW	ELEC KWH	GAS MWH	Dollar Saving		Dollar Saving	Dollars Invested
1	Lavatory Sinks	315,315				1	\$130.86		\$138.43	\$734.40
		0				0	\$0.00		\$0.00	\$0.00
ECO1 TOTAL:		315,315		0	0	1	\$130.86		\$138.43	\$734.40
2	Misc. Sinks	0				0	\$0.00		\$0.00	\$0.00
ECO2 TOTAL:		0		0	0	0	\$0.00		\$0.00	\$0.00
3	Water Closets	24,966					\$10.36		\$10.36	\$120.10
ECO3 TOTAL:		24,966					\$10.36		\$10.36	\$120.10
4	Urinals	12,417					\$5.15		\$5.15	\$63.65
ECO4 TOTAL:		12,417					\$5.15		\$5.15	\$63.65
5	Shower Heads	0				0	\$0.00		\$0.00	\$0.00
ECO5 TOTAL:		0		0	0	0	\$0.00		\$0.00	\$0.00
6	Equipment Related									
ECO6 TOTAL:		0		0	0	0	\$0.00		\$0.00	\$0.00

SYSTEMS CORP

Systems Engineering and Management Corporation, Knoxville, TN

FY94S EEAP FT. KNOX WATER CONSERVATION STUDY

1 of 2

DATE: 29 Oct 94

CALCULATION WORK SHEET 1

FUNCTION: Maintenance

5252

FACILITY NO.:

Operating Hours: 8

10

Occupancy:

ECO Number ECO Type	Existing Fixture System		Retrofited Fixture System		Usage HRS/YR	Fixtures Quantity	Water Leaks Eliminated LPY
	Description	LPM	Description	LPM			
1	Public Lavatory	9.5	Spring Loaded Faucets	4.7	730	1	
Lavatory Sinks							
ECO1 TOTAL:		LPM		LPM		1	0
2							
Misc. Sinks							
ECO2 TOTAL:		LPM		LPM			
3	Floor Mounted Flush Valve	17	Install 3.5 GPF Flush Valve	13.2	3000	1	
Water Closets							
			Repair Kit				
ECO3 TOTAL:		LPM		LPM		1	0
4	Wall Mounted Flush Valve	5.68	Install 1.0 GPF Flush Valve	3.79	18250	1	
Urinals							
			Repair Kit				
ECO4 TOTAL:		LPM		LPM		1	0
5							
Shower Heads							
ECO5 TOTAL:		LPM		LPM		0	0
6							
Equipment Related							
ECO6 TOTAL:						0	0

SYSTEMS CORP

Systems Engineering and Management Corporation, Knoxville, TN

CALCULATION WORK SHEET 2

FACILITY NO.: 5252
 Water Rate: 0.42 \$/KL Energy Rate: \$/KWH
 Gas Rate: 10.51 \$/MWH Demand Rate: \$/KW

ECO Number	Annual Water Saving	LPY	Annual Energy Saving			WATER		Total	Total
ECO Type			ELEC KW	ELEC KWH	GAS MWH	Dollar Saving	Dollar Saving	Dollar Saving	Dollars Invested
1	261,705				1	\$108.61	\$115.52	\$244.80	
Lavatory Sinks	0				0	\$0.00	\$0.00	\$0.00	\$0.00
	0				0	\$0.00	\$0.00	\$0.00	\$0.00
ECO1 TOTAL:	261,705		0	0	1	\$108.61	\$115.52	\$244.80	
2	0				0	\$0.00	\$0.00	\$0.00	\$0.00
Misc. Sinks	0				0	\$0.00	\$0.00	\$0.00	\$0.00
	0				0	\$0.00	\$0.00	\$0.00	\$0.00
ECO2 TOTAL:	0		0	0	0	\$0.00	\$0.00	\$0.00	\$0.00
3	11,400					\$4.73	\$4.73	\$60.05	
Water Closets	0					\$0.00	\$0.00	\$0.00	\$0.00
	0					\$0.00	\$0.00	\$0.00	\$0.00
ECO3 TOTAL:	11,400					\$4.73	\$4.73	\$60.05	
4	34,493					\$14.31	\$14.31	\$63.65	
Urinals	0					\$0.00	\$0.00	\$0.00	\$0.00
	0					\$0.00	\$0.00	\$0.00	\$0.00
ECO4 TOTAL:	34,493					\$14.31	\$14.31	\$63.65	
5	0				0	\$0.00	\$0.00	\$0.00	\$0.00
Shower Heads	0				0	\$0.00	\$0.00	\$0.00	\$0.00
	0				0	\$0.00	\$0.00	\$0.00	\$0.00
ECO5 TOTAL:	0		0	0	0	\$0.00	\$0.00	\$0.00	\$0.00
6	0				0	\$0.00	\$0.00	\$0.00	\$0.00
Equipment Related	0				0	\$0.00	\$0.00	\$0.00	\$0.00
	0				0	\$0.00	\$0.00	\$0.00	\$0.00
	0				0	\$0.00	\$0.00	\$0.00	\$0.00
ECO6 TOTAL:	0		0	0	0	\$0.00	\$0.00	\$0.00	\$0.00

SYSTEMS CORP

Systems Engineering and Management Corporation, Knoxville, TN

FY94S EEAP FT. KNOX WATER CONSERVATION STUDY

1 of 2

CALCULATION WORK SHEET 1

DATE: 29 Oct 94

FACILITY NO.: 5253

FUNCTION:

Maintenance

Occupancy: 10

Operating Hours: 8

ECO Number ECO Type	Existing Fixture System		Retrofited Fixture System		Usage HRS/YR	Fixtures Quantity	Water Leaks Eliminated LPY
	Description	LPM	Description	LPM			
1 Lavatory Sinks	Public Lavatory	26.5	Spring Loaded Faucets	4.7	730	1	
	Public Lavatory	11	Spring Loaded Faucets	4.7	730	3	
ECO1 TOTAL:		LPM		LPM		4	0
2 Misc. Sinks							
ECO2 TOTAL:							
3 Water Closets	Floor Mounted Flush Valve	17	Install 3.5 GPF Flush Valve	13.2	3000	4	0
			Repair Kit				
ECO3 TOTAL:		LPM		LPM	#FL/YR	4	0
4 Urinals	Wall Mounted Flush Valve	5.68	Install 1.0 GPF Flush Valve	3.79	18250	3	
			Repair Kit				
ECO4 TOTAL:		LPM		LPM	HRS/YR	3	0
5 Shower Heads							
ECO5 TOTAL:		LPM		LPM		0	0
6 Equipment Related							
ECO6 TOTAL:						0	0

SYSTEMS CORP

Systems Engineering and Management Corporation, Knoxville, TN

CALCULATION WORK SHEET 2

FACILITY NO.: 5253
 Water Rate: 0.42 \$/KL Energy Rate: \$/KWH
 Gas Rate: 10.51 \$/MWH Demand Rate: \$/KW

ECO Number	ECO Type	Annual Water Saving LPY	Annual Energy Saving			WATER		Total Dollar Saving	Total Dollars Invested
			ELEC KW	ELEC KWH	GAS MWH				
1	Lavatory Sinks	1,006,305			3		\$417.62	\$444.21	\$244.80
		982,215			2		\$407.62	\$431.22	\$734.40
		0			0		\$0.00	\$0.00	\$0.00
ECO1 TOTAL:		1,988,520	0	0	5	\$825.24	\$875.43		\$979.20
2	Misc. Sinks	0			0	\$0.00	\$0.00	\$0.00	\$0.00
		0			0	\$0.00	\$0.00	\$0.00	\$0.00
		0			0	\$0.00	\$0.00	\$0.00	\$0.00
ECO2 TOTAL:		0	0	0	0	\$0.00	\$0.00	\$0.00	\$0.00
3	Water Closets	45,600				\$18.92	\$18.92	\$18.92	\$240.19
		0				\$0.00	\$0.00	\$0.00	\$0.00
		0				\$0.00	\$0.00	\$0.00	\$0.00
ECO3 TOTAL:		45,600				\$18.92	\$18.92	\$18.92	\$240.19
4	Urinals	103,477				\$42.94	\$42.94	\$42.94	\$190.94
		0				\$0.00	\$0.00	\$0.00	\$0.00
		0				\$0.00	\$0.00	\$0.00	\$0.00
ECO4 TOTAL:		103,477				\$42.94	\$42.94	\$42.94	\$190.94
5	Shower Heads	0			0	\$0.00	\$0.00	\$0.00	\$0.00
		0			0	\$0.00	\$0.00	\$0.00	\$0.00
		0			0	\$0.00	\$0.00	\$0.00	\$0.00
ECO5 TOTAL:		0	0	0	0	\$0.00	\$0.00	\$0.00	\$0.00
6	Equipment Related	0			0	\$0.00	\$0.00	\$0.00	\$0.00
		0			0	\$0.00	\$0.00	\$0.00	\$0.00
		0			0	\$0.00	\$0.00	\$0.00	\$0.00
		0			0	\$0.00	\$0.00	\$0.00	\$0.00
ECO6 TOTAL:		0	0	0	0	\$0.00	\$0.00	\$0.00	\$0.00

SYSTEMS CORP

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FY94S EEAP FT. KNOX WATER CONSERVATION STUDY

1 of 2

CALCULATION WORK SHEET 1

DATE: 29 Oct 94

FACILITY NO.: 5256

FUNCTION: Maintenance

Occupancy: 10

Operating Hours: 8

ECO Number ECO Type	Existing Fixture System		Retrofitted Fixture System		Usage HRS/YR	Fixtures Quantity	Water Leaks Eliminated LPY
	Description	LPM	Description	LPM			
1	Public Lavatory	11	Spring Loaded Faucets	4.7	730	2	27890
Lavatory Sinks							
ECO1 TOTAL:		LPM		LPM		2	27890
2	Service Sink	11	Install Aerators	9.5	730	2	
Misc. Sinks							
ECO2 TOTAL:		LPF		LPF	#FL/YR	2	0
3	Floor Mounted Flush Valve	17	Install 3.5 GPF Flush Valve	13.2	3000	3	
Water Closets							
			Repair Kit				
ECO3 TOTAL:		LPF		LPF	#FL/YR	3	0
4	Wall Mounted Flush Valve	5.68	Install 1.0 GPF Flush Valve	3.79	18250	2	
Urinals							
			Repair Kit				
ECO4 TOTAL:		LPM		LPM	HRS/YR	2	0
5							
Shower Heads							
ECO5 TOTAL:		LPM		LPM		0	0
6							
Equipment Related							
ECO6 TOTAL:						0	0

SYSTEMS CORP

Systems Engineering and Management Corporation, Knoxville, TN

CALCULATION WORK SHEET 2

FACILITY NO. : 5256
 Water Rate: 0.42 \$/KL Energy Rate: \$/KWH
 Gas Rate: 10.51 \$/MWH Demand Rate: \$/KW

ECO Number	ECO Type	Annual Water Saving LPY	Annual Energy Saving			WATER		Total	
			ELEC KW	ELEC KWH	GAS MWH	Dollar Saving	Dollar Saving	Dollar Saving	Dollars Invested
1	Lavatory Sinks	682,700			2	\$283.32	\$301.36	\$489.60	
		0			0	\$0.00	\$0.00	\$0.00	
		0			0	\$0.00	\$0.00	\$0.00	
ECO1 TOTAL:		682,700	0	0	2	\$283.32	\$301.36	\$489.60	
2	Misc. Sinks	131,400			0	\$0.55	\$3.70	\$19.39	
		0			0	\$0.00	\$0.00	\$0.00	
		0			0	\$0.00	\$0.00	\$0.00	
ECO2 TOTAL:		131,400	0	0	0	\$0.55	\$3.70	\$19.39	
3	Water Closets	34,200				\$14.19	\$14.19	\$180.14	
		0				\$0.00	\$0.00	\$0.00	
		0				\$0.00	\$0.00	\$0.00	
ECO3 TOTAL:		34,200				\$14.19	\$14.19	\$180.14	
4	Urinals	68,985				\$28.63	\$28.63	\$127.30	
		0				\$0.00	\$0.00	\$0.00	
		0				\$0.00	\$0.00	\$0.00	
ECO4 TOTAL:		68,985				\$28.63	\$28.63	\$127.30	
5	Shower Heads	0			0	\$0.00	\$0.00	\$0.00	
		0			0	\$0.00	\$0.00	\$0.00	
		0			0	\$0.00	\$0.00	\$0.00	
ECO5 TOTAL:		0	0	0	0	\$0.00	\$0.00	\$0.00	
6	Equipment Related	0			0	\$0.00	\$0.00	\$0.00	
		0			0	\$0.00	\$0.00	\$0.00	
		0			0	\$0.00	\$0.00	\$0.00	
		0			0	\$0.00	\$0.00	\$0.00	
ECO6 TOTAL:		0	0	0	0	\$0.00	\$0.00	\$0.00	

SYSTEMS CORP

Systems Engineering and Management Corporation, Knoxville, TN

1										2									
FACILITY NO. : 5916										DATE: 31 Oct 94									
Occupancy: 100										Operating Hours: 15									
FUNCTION: Enlisted Barracks																			
ECO Number	Existing Fixture System	Description	LPM	Retrofitted Fixture System	Description	LPM	Usage	Fixtures	Water Leaks										
ECO Type							HRS/YR	Quantity	Eliminated LPY										
1	Public Lavatory		9.5	Spring Loaded Faucets		4.7	730	31											
ECO1 TOTAL:			LPM			LPM		31	0										
2																			
Misc. Sinks																			
ECO2 TOTAL:			LPM			LPM		0	0										
3	Floor Mounted Flush Valve		17	Install 3.5 GPF Flush Valve		13.2	3000	36											
Water Closets				Repair Kit															
ECO3 TOTAL :			LPM			LPM		36	0										
4	Wall Mounted Flush Valve		5.68	Install 1.0 GPF Flush Valve		3.79	7000	22											
Urinals				Repair Kit															
ECO4 TOTAL :			LPM			LPM		22	0										
5																			
Shower Heads																			
ECO5 TOTAL :			LPM			LPM		0	0										
6																			
Equipment																			
Related																			
ECO6 TOTAL :								0	0										

SYSTEMS CORP

Systems Engineering and Management Corporation, Knoxville, TN

FY94S EEAP FT. KNOX WATER CONSERVATION STUDY

2 OF 2

CALCULATION WORK SHEET 2

FACILITY NO.: 5916
 Water Rate: 0.42 \$/KL Energy Rate: \$/KWH
 Gas Rate: 10.51 \$/MWH Demand Rate: \$/KW

ECO Number	Annual Water Saving LPY	Annual Energy Saving			WATER	Total	Total
ECO Type		ELEC KW	ELEC KWH	GAS MWH	Dollar Saving	Dollar Saving	Dollars Invested
1 Lavatory Sinks	8,112,855 0			19 0	\$3,366.83 \$0.00	\$3,561.74 \$0.00	\$7,588.80 \$0.00
ECO1 TOTAL:	8,112,855	0	0	19	\$3,366.83	\$3,561.74	\$7,588.80
2 Misc. Sinks	0			0	\$0.00	\$0.00	\$0.00
ECO2 TOTAL:	0	0	0	0	\$0.00	\$0.00	\$0.00
3 Water Closets	410,400				\$170.32	\$170.32	\$2,161.73
ECO3 TOTAL:	410,400				\$170.32	\$170.32	\$2,161.73
4 Urinals	291,060				\$120.79	\$120.79	\$1,400.26
ECO4 TOTAL:	291,060				\$120.79	\$120.79	\$1,400.26
5 Shower Heads	0			0	\$0.00	\$0.00	\$0.00
ECO5 TOTAL:	0	0	0	0	\$0.00	\$0.00	\$0.00
6 Equipment Related							
ECO6 TOTAL:	0	0	0	0	\$0.00	\$0.00	\$0.00

SYSTEMS CORP

Systems Engineering and Management Corporation, Knoxville, TN

FY94S EEAP FT. KNOX WATER CONSERVATION STUDY

10.2

CALCULATION WORK SHEET 1

DATE: 29 Oct 94

FACILITY NO.: 5917

FUNCTION:

Enl. Pers./Dining

Occupancy: 3 Meals / Day

Operating Hours:

24

ECO Number ECO Type	Existing Fixture System		Retrofited Fixture System		Usage HRS/YR	Fixtures Quantity	Water Leaks Eliminated LPY
	Description	LPM	Description	LPM			
1	Dual Faucets	9.5	Spring Loaded Faucets	4.7	730	3	
Lavatory Sinks							
ECO1 TOTAL:		LPM		LPM		3	0
2							
Misc. Sinks							
ECO2 TOTAL:		LPM		LPM			
3	Floor Mounted Flush Valve	17	Install 3.5 GPF Flush Valve	13.2	10950	2	0
Water Closets							
ECO3 TOTAL:		LPM		LPM			
4	Wall Mounted Flush Valve	5.68	Install 1.0 GPF Flush Valve	3.79	10950	1	
Urinals							
ECO4 TOTAL:		LPM		LPM			
5							
Shower Heads							
ECO5 TOTAL:		LPM		LPM		0	0
6	3 Comp. Sink (2 faucets)	17	Install Aerators	9.5	1460	1	
Equipment							
	2 Comp. Sink (2 faucets)	17	Install Aerators	9.5	1460	2	
Related							
ECO6 TOTAL:						3	0

SYSTEMS CORP

Systems Engineering and Management Corporation, Knoxville, TN

CALCULATION WORK SHEET 2

FACILITY NO. : 5917 Water Rate: 0.42 \$/KL Energy Rate: \$/KWH

Gas Rate: 10.51 \$/MWH Demand Rate: \$/KW

ECO Number	Annual Water Saving LPY	Annual Energy Saving			WATER	Total	Total
ECO Type	Saving LPY	ELEC KW	ELEC KWH	GAS MWH	Dollar Saving	Dollar Saving	Dollars Invested
1	785,115			1	\$325.82	\$338.55	\$612.00
Lavatory Sinks	0			0	\$0.00	\$0.00	\$0.00
	0			0	\$0.00	\$0.00	\$0.00
ECO1 TOTAL:	785,115	0	0	1	\$325.82	\$338.55	\$612.00
2	0			0	\$0.00	\$0.00	\$0.00
Misc. Sinks	0			0	\$0.00	\$0.00	\$0.00
	0			0	\$0.00	\$0.00	\$0.00
ECO2 TOTAL:	0	0	0	0	\$0.00	\$0.00	\$0.00
3	83,220				\$34.54	\$34.54	\$100.08
Water Closets	0				\$0.00	\$0.00	\$0.00
	0				\$0.00	\$0.00	\$0.00
ECO3 TOTAL:	83,220				\$34.54	\$34.54	\$100.08
4	20,696				\$8.59	\$8.59	\$53.04
Urinals	0				\$0.00	\$0.00	\$0.00
	0				\$0.00	\$0.00	\$0.00
ECO4 TOTAL:	20,696				\$8.59	\$8.59	\$53.04
5	0			0	\$0.00	\$0.00	\$0.00
Shower Heads	0			0	\$0.00	\$0.00	\$0.00
	0			0	\$0.00	\$0.00	\$0.00
ECO5 TOTAL:	0	0	0	0	\$0.00	\$0.00	\$0.00
6	657,000			101	\$272.66	\$1,338.05	\$8.08
Equipment Related	1,314,000			203	\$545.31	\$2,676.11	\$16.16
	0			0	\$0.00	\$0.00	\$0.00
	0			0	\$0.00	\$0.00	\$0.00
	0			0	\$0.00	\$0.00	\$0.00
ECO6 TOTAL:	1,971,000	0	0	304	\$817.97	\$4,014.16	\$24.24

SYSTEMS CORP

Systems Engineering and Management Corporation, Knoxville, TN

FY94S EEAP FT. KNOX WATER CONSERVATION STUDY

1002

CALCULATION WORK SHEET 1

DATE: 31 Oct 94

FACILITY NO.: 5918

FUNCTION:

Chapel

Occupancy:

Operating Hours:

ECO Number ECO Type	Existing Fixture System		Retrofited Fixture System		Usage HRS/YR	Fixtures Quantity	Water Leaks Eliminated LPY
	Description	LPM	Description	LPM			
1	Public Lavatory	9.5	Spring Loaded Faucets	4.7	130	3	
Lavatory Sinks							
ECO1 TOTAL:		LPM		LPM		3	0
2							
Misc. Sinks							
ECO2 TOTAL:							
3	Floor Mounted Flush Valve	17	Install 3.5 GPF Flush Valve	13.2	1300	3	0
Water Closets							
			Repair Kit				
ECO3 TOTAL:		LPF		LPF	#FL/YR	3	0
4	Wall Mounted Flush Valve	5.68	Install 1.0 GPF Flush Valve	3.79	1300	2	
Urinals							
			Repair Kit				
ECO4 TOTAL:		LPM		LPM	HRS/YR	2	0
5							
Shower Heads							
ECO5 TOTAL:		LPM		LPM		0	0
6							
Equipment Related							
ECO6 TOTAL:						0	0

SYSTEMS CORP

Systems Engineering and Management Corporation, Knoxville, TN

FY94S EEAP FT. KNOX WATER CONSERVATION STUDY 2 OF 2

CALCULATION WORK SHEET 2

FACILITY NO.: 5918 Water Rate: 0.42 \$/KL Energy Rate: \$/KWH

Gas Rate: 10.51 \$/MWH Demand Rate: \$/KW

ECO Number	Annual Water Saving LPY	Annual Energy Saving			WATER		Total	
		ELEC KW	ELEC KWH	GAS MWH	Dollar Saving	Dollar Saving	Dollar Saving	Dollars Invested
1	139,815			0	\$58.02	\$61.38	\$734.40	
Lavatory Sinks	0			0	\$0.00	\$0.00	\$0.00	
ECO1 TOTAL:	139,815	0	0	0	\$58.02	\$61.38	\$734.40	
2	0			0	\$0.00	\$0.00	\$0.00	
Misc. Sinks								
ECO2 TOTAL:	0	0	0	0	\$0.00	\$0.00	\$0.00	
3	14,820				\$6.15	\$6.15	\$180.14	
Water Closets								
ECO3 TOTAL:	14,820				\$6.15	\$6.15	\$180.14	
4	4,914				\$2.04	\$2.04	\$127.30	
Urinals								
ECO4 TOTAL:	4,914				\$2.04	\$2.04	\$127.30	
5	0			0	\$0.00	\$0.00	\$0.00	
Shower Heads								
ECO5 TOTAL:	0	0	0	0	\$0.00	\$0.00	\$0.00	
6								
Equipment Related								
ECO6 TOTAL:	0	0	0	0	\$0.00	\$0.00	\$0.00	

SYSTEMS CORP

Systems Engineering and Management Corporation, Knoxville, TN

FY94S EEAP FT. KNOX WATER CONSERVATION STUDY										182
CALCULATION WORK SHEET 1										DATE: 31 Oct 94
FACILITY NO. : 5920		FUNCTION: Enlisted Barracks								
Occupancy: 100		Operating Hours: 15								
ECO Number	ECO Type	Existing Fixture System		Retrofitted Fixture System		Usage	Fixtures	Water Leaks		
		Description	LPM	Description	LPM	HRS/YR	Quantity	Eliminated	LPY	
1	Lavatory Sinks	Public Lavatory	9.5	Spring Loaded Faucets	4.7	730	34			
ECO1 TOTAL:			LPM		LPM		34		0	
2	Misc. Sinks									
ECO2 TOTAL:										
3	Water Closets	Floor Mounted Flush Valve	17	Install 3.5 GPF Flush Valve	13.2	3000	36			
ECO3 TOTAL:			LPF		LPF	#FL/YR	0		0	
4	Urinals	Wall Mounted Flush Valve	5.68	Install 1.0 GPF Flush Valve	3.79	7000	22			
ECO4 TOTAL:			LPF		LPF	#FL/YR	36		0	
5	Shower Heads									
ECO5 TOTAL:			LPM		LPM	HRS/YR	22		0	
6	Equipment Related									
ECO6 TOTAL:							0		0	

CALCULATION WORK SHEET 2

FACILITY NO.: 5920
 Water Rate: 0.42 \$/KL Energy Rate: \$/KWH
 Gas Rate: 10.51 \$/MWH Demand Rate: \$/KW

ECO Number	ECO Type	Annual Water		Annual Energy Saving			WATER		Total	
		Saving	LPY	ELEC KW	ELEC KWH	GAS MWH	Dollar Saving	Dollar Saving	Dollar Saving	Dollars Invested
1	Lavatory Sinks	8,897,970				20	\$3,692.66	\$3,906.42	\$3,906.42	\$8,323.20
		0				0	\$0.00	\$0.00	\$0.00	\$0.00
ECO1 TOTAL:		8,897,970		0	0	20	\$3,692.66	\$3,906.42	\$3,906.42	\$8,323.20
2	Misc. Sinks	0				0	\$0.00	\$0.00	\$0.00	\$0.00
ECO2 TOTAL:		0		0	0	0	\$0.00	\$0.00	\$0.00	\$0.00
3	Water Closets	410,400					\$170.32	\$170.32	\$170.32	\$2,161.73
ECO3 TOTAL:		410,400					\$170.32	\$170.32	\$170.32	\$2,161.73
4	Urinals	291,060					\$120.79	\$120.79	\$120.79	\$1,400.26
ECO4 TOTAL:		291,060					\$120.79	\$120.79	\$120.79	\$1,400.26
5	Shower Heads	0				0	\$0.00	\$0.00	\$0.00	\$0.00
ECO5 TOTAL:		0		0	0	0	\$0.00	\$0.00	\$0.00	\$0.00
6	Equipment Related									
ECO6 TOTAL:		0		0	0	0	\$0.00	\$0.00	\$0.00	\$0.00

SYSTEMS CORP

Systems Engineering and Management Corporation, Knoxville, TN

FY94S EEAP FT. KNOX WATER CONSERVATION STUDY

1002

CALCULATION WORK SHEET 1

DATE: 31 Oct 94

FUNCTION: Admin/Supply

FACILITY NO.: 5925

Operating Hours: 10

Occupancy: 18

ECO Number ECO Type	Existing Fixture System		Retrofited Fixture System		Usage HRS/YR	Fixtures Quantity	Water Leaks Eliminated LPY
	Description	LPM	Description	LPM			
1	Public Lavatory	9.5	Spring Loaded Faucets	4.7	130	6	
Lavatory Sinks							
ECO1 TOTAL:		LPM		LPM		6	0
2							
Misc. Sinks							
ECO2 TOTAL:		LPM		LPM		0	0
3	Floor Mounted Flush Valve	17	Install 3.5 GPF Flush Valve	13.2	2200	5	
Water Closets							
			Repair Kit				
ECO3 TOTAL:		LPM		LPM		5	0
4	Wall Mounted Flush Valve	5.68	Install 1.0 GPF Flush Valve	3.79	8700	3	
Urinals							
			Repair Kit				
ECO4 TOTAL:		LPM		LPM		3	0
5							
Shower Heads							
ECO5 TOTAL:		LPM		LPM		0	0
6							
Equipment Related							
ECO6 TOTAL:						0	0

CALCULATION WORK SHEET 2

FACILITY NO.: 5925 Water Rate: 0.42 \$/KL Energy Rate: \$/KWH

Gas Rate: 10.51 \$/MWH Demand Rate: \$/KW

ECO Number	ECO Type	Annual Water Saving LPY	Annual Energy Saving			WATER		Total	
			ELEC KW	ELEC KWH	GAS MWH	Dollar Saving	Dollar Saving	Dollar Saving	Dollars Invested
1	Lavatory Sinks	279,630			1	\$116.05	\$122.76	\$1,468.80	
		0			0	\$0.00	\$0.00	\$0.00	
ECO1 TOTAL:		279,630	0	0	1	\$116.05	\$122.76	\$1,468.80	
2	Misc. Sinks	0			0	\$0.00	\$0.00	\$0.00	
ECO2 TOTAL:		0	0	0	0	\$0.00	\$0.00	\$0.00	
3	Water Closets	41,800				\$17.35	\$17.35	\$300.24	
ECO3 TOTAL:		41,800				\$17.35	\$17.35	\$300.24	
4	Urinals	49,329				\$20.47	\$20.47	\$190.94	
ECO4 TOTAL:		49,329				\$20.47	\$20.47	\$190.94	
5	Shower Heads	0			0	\$0.00	\$0.00	\$0.00	
ECO5 TOTAL:		0	0	0	0	\$0.00	\$0.00	\$0.00	
6	Equipment Related								
ECO6 TOTAL:		0	0	0	0	\$0.00	\$0.00	\$0.00	\$0.00

SYSTEMS CORP

Systems Engineering and Management Corporation, Knoxville, TN

FY94S EEAP FT. KNOX WATER CONSERVATION STUDY

1002

CALCULATION WORK SHEET 1

DATE: 31 Oct 94

FACILITY NO.: 5926

FUNCTION: Admin. Fac.

Occupancy: 28

Operating Hours: 12

ECO Number ECO Type	Existing Fixture System		Retrofitted Fixture System		Usage HRS/YR	Fixtures Quantity	Water Leaks Eliminated LPY
	Description	LPM	Description	LPM			
1	Public Lavatory	17	Spring Loaded Faucets	4.7	130	15	
Lavatory Sinks							
ECO1 TOTAL:		LPM		LPM		15	0
2							
Misc. Sinks							
ECO2 TOTAL:		LPM		LPM			
3	Floor Mounted Flush Valve	17	Install 3.5 GPF Flush Valve	13.2	2200	5	
Water Closets							
ECO3 TOTAL:		LPM		LPM		5	0
4	Wall Mounted Flush Valve	5.68	Install 1.0 GPF Flush Valve	3.79	4368	5	
Urinals							
ECO4 TOTAL:		LPM		LPM		5	0
5							
Shower Heads							
ECO5 TOTAL:		LPM		LPM		0	0
6							
Equipment Related							
ECO6 TOTAL:						0	0

SYSTEMS CORP

Systems Engineering and Management Corporation, Knoxville, TN

FY94S EEAP FT. KNOX WATER CONSERVATION STUDY

2 OF 2

CALCULATION WORK SHEET 2

FACILITY NO.: 5926 Water Rate: 0.42 \$/KL Energy Rate: \$/KWH

Gas Rate: 10.51 \$/MWH Demand Rate: \$/KW

ECO Number	Annual Water Saving	LPY	Annual Energy Saving			WATER		Total	Total
ECO Type			ELEC KW	ELEC KWH	GAS MWH	Dollar Saving	Dollar Saving	Dollar Saving	Dollars Invested
1	1,576,575				4	\$654.28	\$692.15	\$3,672.00	
Lavatory Sinks	0				0	\$0.00	\$0.00	\$0.00	
ECO1 TOTAL:	1,576,575		0	0	4	\$654.28	\$692.15	\$3,672.00	
2	0				0	\$0.00	\$0.00	\$0.00	
Misc. Sinks									
ECO2 TOTAL:	0		0	0	0	\$0.00	\$0.00	\$0.00	
3	41,800					\$17.35	\$17.35	\$300.24	
Water Closets									
ECO3 TOTAL:	41,800					\$17.35	\$17.35	\$300.24	
4	41,278					\$17.13	\$17.13	\$318.24	
Urinals									
ECO4 TOTAL:	41,278					\$17.13	\$17.13	\$318.24	
5	0				0	\$0.00	\$0.00	\$0.00	
Shower Heads									
ECO5 TOTAL:	0		0	0	0	\$0.00	\$0.00	\$0.00	
6									
Equipment Related									
ECO6 TOTAL:	0		0	0	0	\$0.00	\$0.00	\$0.00	

SYSTEMS CORP

Systems Engineering and Management Corporation, Knoxville, TN

FY94S EEAP FT. KNOX WATER CONSERVATION STUDY

1002

DATE: 31 Oct 94

CALCULATION WORK SHEET 1

FACILITY NO. : 5927

FUNCTION: Gym

Occupancy: Varies

Operating Hours: Varies

ECO Number ECO Type	Existing Fixture System		Retrofited Fixture System		Usage HRS/YR	Fixtures Quantity	Water Leaks Eliminated LPY
	Description	LPM	Description	LPM			
1	Public Lavatory	9.5	Spring Loaded Faucets	4.7	365	12	
Lavatory Sinks							
ECO1 TOTAL:		LPM		LPM		12	0
2							
Misc. Sinks							
ECO2 TOTAL:		LPF		LPF	#FL/YR	0	0
3	Floor Mounted Flush Valve	17	Install 3.5 GPF Flush Valve	13.2	2200	10	
Water Closets							
			Repair Kit				
ECO3 TOTAL:		LPF		LPF	#FL/YR	10	0
4	Wall Mounted Flush Valve	5.68	Install 1.0 GPF Flush Valve	3.79	2200	4	
Urinals							
			Repair Kit				
ECO4 TOTAL:		LPM		LPM	HRS/YR	4	0
5							
Shower Heads							
ECO5 TOTAL:		LPM		LPM		0	0
6							
Equipment Related							
ECO6 TOTAL:						0	0

SYSTEMS CORP

Systems Engineering and Management Corporation, Knoxville, TN

CALCULATION WORK SHEET 2

FACILITY NO.: 5927 Water Rate: 0.42 \$/KL Energy Rate: \$/KWH

Gas Rate: 10.51 \$/MWH Demand Rate: \$/KW

ECO Number	ECO Type	Annual Water Saving LPY	Annual Energy Saving			WATER		Total	
			ELEC KW	ELEC KWH	GAS MWH	Dollar Saving	Dollar Saving	Dollar Saving	Dollars Invested
1	Lavatory Sinks	1,570,230			4	\$651.65		\$689.37	\$2,937.60
ECO1 TOTAL:		1,570,230	0	0	4	\$651.65	\$689.37	\$689.37	\$2,937.60
2	Misc. Sinks	0			0	\$0.00		\$0.00	\$0.00
ECO2 TOTAL:		0	0	0	0	\$0.00	\$0.00	\$0.00	\$0.00
3	Water Closets	83,600				\$34.69		\$34.69	\$600.48
ECO3 TOTAL:		83,600				\$34.69	\$34.69	\$34.69	\$600.48
4	Urinals	16,632				\$6.90		\$6.90	\$254.59
ECO4 TOTAL:		16,632				\$6.90	\$6.90	\$6.90	\$254.59
5	Shower Heads	0			0	\$0.00		\$0.00	\$0.00
ECO5 TOTAL:		0	0	0	0	\$0.00	\$0.00	\$0.00	\$0.00
6	Equipment Related								
ECO6 TOTAL:		0	0	0	0	\$0.00	\$0.00	\$0.00	\$0.00

SYSTEMS CORP

Systems Engineering and Management Corporation, Knoxville, TN

FY94S EEAP FT. KNOX WATER CONSERVATION STUDY

1002

CALCULATION WORK SHEET 1

DATE: 31 Oct 94

FACILITY NO.: 5928 FUNCTION: Theater

Occupancy: Varies Operating Hours: 4 movies/wk

ECO Number ECO Type	Existing Fixture System		Retrofited Fixture System		Usage HRS/YR	Fixtures Quantity	Water Leaks Eliminated LPY
	Description	LPM	Description	LPM			
1	Public Lavatory	9.5	Spring Loaded Faucets and Mixing Valve	4.7	130	6	
ECO1 TOTAL:		LPM		LPM		6	0
2	Misc. Sinks						
ECO2 TOTAL:		LPM					
3	Floor Mounted Flush Valve	17	Install 3.5 GPF Flush Valve Repair Kit	13.2	1300	5	0
Water Closets							
ECO3 TOTAL:		LPM		LPM	#FL/YR	5	0
4	Wall Mounted Flush Valve	5.68	Install 1.0 GPF Flush Valve Repair Kit	3.79	1300	2	
Urinals							
ECO4 TOTAL:		LPM		LPM	HRS/YR	2	0
5	Shower Heads						
ECO5 TOTAL:		LPM		LPM		0	0
6	Equipment Related						
ECO6 TOTAL:						0	0

SYSTEMS CORP

Systems Engineering and Management Corporation, Knoxville, TN

CALCULATION WORK SHEET 2

FACILITY NO.: 5928 Water Rate: 0.42 \$/KL Energy Rate: \$/KWH

Gas Rate: 10.51 \$/MWH Demand Rate: \$/KW

ECO Number	Annual Water Saving LPY	Annual Energy Saving			WATER		Total	
		ELEC KW	ELEC KWH	GAS MWH	Dollar Saving	Dollar Saving	Dollar Saving	Dollars Invested
1	279,630			1	\$116.05	\$122.76	\$1,468.80	
Lavatory Sinks								
ECO1 TOTAL:	279,630	0	0	1	\$116.05	\$122.76	\$1,468.80	
2	0			0	\$0.00	\$0.00	\$0.00	
Misc. Sinks								
ECO2 TOTAL:	0	0	0	0	\$0.00	\$0.00	\$0.00	
3	24,700				\$10.25	\$10.25	\$300.24	
Water Closets								
ECO3 TOTAL:	24,700				\$10.25	\$10.25	\$300.24	
4	4,914				\$2.04	\$2.04	\$127.30	
Urinals								
ECO4 TOTAL:	4,914				\$2.04	\$2.04	\$127.30	
5	0			0	\$0.00	\$0.00	\$0.00	
Shower Heads								
ECO5 TOTAL:	0	0	0	0	\$0.00	\$0.00	\$0.00	
6								
Equipment Related								
ECO6 TOTAL:	0	0	0	0	\$0.00	\$0.00	\$0.00	

SYSTEMS CORP

Systems Engineering and Management Corporation, Knoxville, TN

FY94S EEAP FT. KNOX WATER CONSERVATION STUDY

10/2

CALCULATION WORK SHEET 1

DATE: 29 Oct 94

FACILITY NO.: 6117

FUNCTION: Maintenance

Occupancy: 8

Operating Hours: 8

ECO Number ECO Type	Existing Fixture System		Retrofitted Fixture System		Usage HRS/YR	Fixtures Quantity	Water Leaks Eliminated LPY
	Description	LPM	Description	LPM			
1	Lavatory Sinks						
ECO1 TOTAL:		LPM		LPM	0	0	0
2	Misc. Sinks						0
ECO2 TOTAL:		LPM					
3	Floor Mounted Flush Valve	17	Install 3.5 GPF Flush Valve	13.2	3000	2	
Water Closets			Repair Kit				
ECO3 TOTAL:		LPM		LPM	#FL/YR	0	0
4	Wall Mounted Flush Valve	5.68	Install 1.0 GPF Flush Valve	3.79	18250	1	
Urinals			Repair Kit				
ECO4 TOTAL:		LPM		LPM	HRS/YR	1	0
5	Shower Heads						0
ECO5 TOTAL:		LPM		LPM		0	0
6	Equipment Related						
ECO6 TOTAL:						0	0

SYSTEMS CORP

Systems Engineering and Management Corporation, Knoxville, TN

FY94S EEAP FT. KNOX WATER CONSERVATION STUDY 2 OF 2

CALCULATION WORK SHEET 2

FACILITY NO.: 6117
 Water Rate: 0.42 \$/KL Energy Rate: \$/KWH
 Gas Rate: 10.51 \$/MWH Demand Rate: \$/KW

ECO Number	Annual Water		Annual Energy Saving			WATER		Total	
	Saving	LPY	ELEC KW	ELEC KWH	GAS MWH	Dollar Saving	Dollar Saving	Dollar Saving	Dollars Invested
1	0				0	\$0.00	\$0.00	\$0.00	\$0.00
Lavatory Sinks	0				0	\$0.00	\$0.00	\$0.00	\$0.00
	0				0	\$0.00	\$0.00	\$0.00	\$0.00
ECO1 TOTAL:	0		0	0	0	\$0.00	\$0.00	\$0.00	\$0.00
2	0				0	\$0.00	\$0.00	\$0.00	\$0.00
Misc. Sinks	0				0	\$0.00	\$0.00	\$0.00	\$0.00
	0				0	\$0.00	\$0.00	\$0.00	\$0.00
ECO2 TOTAL:	0		0	0	0	\$0.00	\$0.00	\$0.00	\$0.00
3	22,800					\$9.46	\$9.46	\$9.46	\$120.10
Water Closets	0					\$0.00	\$0.00	\$0.00	\$0.00
	0					\$0.00	\$0.00	\$0.00	\$0.00
ECO3 TOTAL:	22,800					\$9.46	\$9.46	\$9.46	\$120.10
4	34,493					\$14.31	\$14.31	\$14.31	\$63.65
Urinals	0					\$0.00	\$0.00	\$0.00	\$0.00
	0					\$0.00	\$0.00	\$0.00	\$0.00
ECO4 TOTAL:	34,493					\$14.31	\$14.31	\$14.31	\$63.65
5	0				0	\$0.00	\$0.00	\$0.00	\$0.00
Shower Heads	0				0	\$0.00	\$0.00	\$0.00	\$0.00
	0				0	\$0.00	\$0.00	\$0.00	\$0.00
ECO5 TOTAL:	0		0	0	0	\$0.00	\$0.00	\$0.00	\$0.00
6	0				0	\$0.00	\$0.00	\$0.00	\$0.00
Equipment Related	0				0	\$0.00	\$0.00	\$0.00	\$0.00
	0				0	\$0.00	\$0.00	\$0.00	\$0.00
	0				0	\$0.00	\$0.00	\$0.00	\$0.00
ECO6 TOTAL:	0		0	0	0	\$0.00	\$0.00	\$0.00	\$0.00

SYSTEMS CORP

Systems Engineering and Management Corporation, Knoxville, TN

FY94S EEAP FT. KNOX WATER CONSERVATION STUDY										1 OF 2	
CALCULATION WORK SHEET 1										DATE: 29 Oct 94	
FACILITY NO. :		6147		FUNCTION:		Maintenance					
Occupancy:		10		Operating Hours:		8					
ECO Number ECO Type	Existing Fixture System		Retrofited Fixture System		Usage HRS/YR	Fixtures Quantity	Water Leaks Eliminated LPY				
	Description	LPM	Description	LPM							
1 Lavatory Sinks											
ECO1 TOTAL:		LPM		LPM		0	0				
2 Misc. Sinks											
ECO2 TOTAL:											
3 Water Closets	Floor Mounted Flush Valve	LPF 17	Install 3.5 GPF Flush Valve	LPF 13.2	3000	2					
			Repair Kit								
ECO3 TOTAL:		LPF		LPF	#FL/YR	0	0				
4 Urinals	Wall Mounted Flush Valve	LPF 5.68	Install 1.0 GPF Flush Valve	LPF 3.79	18250	1					
			Repair Kit								
ECO4 TOTAL :		LPM		LPM	HRS/YR	1	0				
5 Shower Heads							0				
ECO5 TOTAL :		LPM		LPM		0	0				
6 Equipment Related											
ECO6 TOTAL :						0	0				

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CALCULATION WORK SHEET 2

FACILITY NO.: 6147 Water Rate: 0.42 \$/KL Energy Rate: \$/KWH

Gas Rate: 10.51 \$/MWH Demand Rate: \$/KW

ECO Number	ECO Type	Annual Water		Annual Energy Saving			WATER		Total	
		Saving	LPY	ELEC KW	ELEC KWH	GAS MWH	Dollar Saving		Dollar Saving	
1	Lavatory Sinks	0				0	\$0.00		\$0.00	
		0				0	\$0.00		\$0.00	
		0				0	\$0.00		\$0.00	
ECO1 TOTAL:		0		0	0	0	\$0.00		\$0.00	
2	Misc. Sinks	0				0	\$0.00		\$0.00	
		0				0	\$0.00		\$0.00	
		0				0	\$0.00		\$0.00	
ECO2 TOTAL:		0		0	0	0	\$0.00		\$0.00	
3	Water Closets	22,800					\$9.46		\$9.46	
		0					\$0.00		\$0.00	
		0					\$0.00		\$0.00	
ECO3 TOTAL:		22,800					\$9.46		\$9.46	
4	Urinals	34,493					\$14.31		\$14.31	
		0					\$0.00		\$0.00	
		0					\$0.00		\$0.00	
ECO4 TOTAL:		34,493					\$14.31		\$14.31	
5	Shower Heads	0				0	\$0.00		\$0.00	
		0				0	\$0.00		\$0.00	
		0				0	\$0.00		\$0.00	
ECO5 TOTAL:		0		0	0	0	\$0.00		\$0.00	
6	Equipment Related	0				0	\$0.00		\$0.00	
		0				0	\$0.00		\$0.00	
		0				0	\$0.00		\$0.00	
		0				0	\$0.00		\$0.00	
ECO6 TOTAL:		0		0	0	0	\$0.00		\$0.00	

SYSTEMS CORP

Systems Engineering and Management Corporation, Knoxville, TN

FY94S EEAP FT. KNOX WATER CONSERVATION STUDY

1002

CALCULATION WORK SHEET 1

DATE: 31 Oct 94

FACILITY NO. : 6291

FUNCTION: Training Building

Occupancy: _____

Operating Hours: _____

ECO Number ECO Type	Existing Fixture System		Retrofited Fixture System		Usage HRS/YR	Fixtures Quantity	Water Leaks Eliminated LPY
	Description	LPM	Description	LPM			
1	Public Lavatory	15	Spring Loaded Faucets	4.7	130	1	
Lavatory Sinks							
ECO1 TOTAL:		LPM		LPM		1	0
2							
Misc. Sinks							
ECO2 TOTAL:		LPF		LPF	#FL/YR	0	0
3	Floor Mounted Flush Valve	17	Install 3.5 GPF Flush Valve	13.2	2200	1	
Water Closets			Repair Kit				
ECO3 TOTAL :		LPF		LPF	#FL/YR	1	0
4							
Urinals							
ECO4 TOTAL :		LPM		LPM	HRS/YR	0	0
5							
Shower Heads							
ECO5 TOTAL :		LPM		LPM		0	0
6							
Equipment							
Related							
ECO6 TOTAL :						0	0

CALCULATION WORK SHEET 2

FACILITY NO.: 6291 Water Rate: 0.42 \$/KL Energy Rate: \$/KWH

Gas Rate: 10.51 \$/MWH Demand Rate: \$/KW

ECO Number	ECO Type	Annual Water Saving LPY	Annual Energy Saving			WATER		Total	
			ELEC KW	ELEC KWH	GAS MWH	Dollar Saving	Dollar Saving	Dollar Saving	Dollars Invested
1	Lavatory Sinks	89,505			0	\$37.14	\$39.29	\$244.80	
		0			0	\$0.00	\$0.00	\$0.00	
ECO1 TOTAL:		89,505	0	0	0	\$37.14	\$39.29	\$244.80	
2	Misc. Sinks	0			0	\$0.00	\$0.00	\$0.00	
ECO2 TOTAL:		0	0	0	0	\$0.00	\$0.00	\$0.00	
3	Water Closets	8,360				\$3.47	\$3.47	\$60.05	
ECO3 TOTAL:		8,360				\$3.47	\$3.47	\$60.05	
4	Urinals	0				\$0.00	\$0.00	\$0.00	
ECO4 TOTAL:		0				\$0.00	\$0.00	\$0.00	
5	Shower Heads	0			0	\$0.00	\$0.00	\$0.00	
ECO5 TOTAL:		0	0	0	0	\$0.00	\$0.00	\$0.00	
6	Equipment Related								
ECO6 TOTAL:		0	0	0	0	\$0.00	\$0.00	\$0.00	

SYSTEMS CORP

Systems Engineering and Management Corporation, Knoxville, TN

FY94S EEAP FT. KNOX WATER CONSERVATION STUDY

1 Oct 94

CALCULATION WORK SHEET 1

DATE: 31 Oct 94

FACILITY NO.: 6535

FUNCTION:

Training Building

Occupancy: 70

Operating Hours:

9

ECO Number ECO Type	Existing Fixture System		Retrofited Fixture System		Usage HRS/YR	Fixtures Quantity	Water Leaks Eliminated LPY
	Description	LPM	Description	LPM			
1	Public Lavatory	9.5	Spring Loaded Faucets	4.7	130	11	15800
Lavatory Sinks							
ECO1 TOTAL:		LPM		LPM		11	15800
2							
Misc. Sinks							
ECO2 TOTAL:							
3	Floor Mounted Flush Valve	17	Install 3.5 GPF Flush Valve	LPF 13.2	3000	8	0
Water Closets			Repair Kit				
ECO3 TOTAL:		LPF		LPF	#FL/YR	8	0
4	Wall Mounted Flush Valve	5.68	Install 1.0 GPF Flush Valve	3.79	10000	8	
Urinals			Repair Kit				
ECO4 TOTAL:		LPM		LPM	HRS/YR	8	0
5							
Shower Heads							
ECO5 TOTAL:		LPM		LPM		0	0
6							
Equipment							
Related							
ECO6 TOTAL:						0	0

SYSTEMS CORP

Systems Engineering and Management Corporation, Knoxville, TN

CALCULATION WORK SHEET 2

FACILITY NO.: 6535 Water Rate: 0.42 \$/KL Energy Rate: \$/KWH

Gas Rate: 10.51 \$/MWH Demand Rate: \$/KW

ECO Number	ECO Type	Annual Water Saving LPY	Annual Energy Saving			WATER		Total	
			ELEC KW	ELEC KWH	GAS MWH	Dollar Saving	Dollar Saving	Dollar Saving	Dollars Invested
1	Lavatory Sinks	528,455			1	\$219.31	\$232.00	\$2,692.80	
		0			0	\$0.00	\$0.00	\$0.00	
ECO1 TOTAL:		528,455	0	0	1	\$219.31	\$232.00	\$2,692.80	
2	Misc. Sinks	0			0	\$0.00	\$0.00	\$0.00	
ECO2 TOTAL:		0	0	0	0	\$0.00	\$0.00	\$0.00	
3	Water Closets	91,200				\$37.85	\$37.85	\$480.38	
ECO3 TOTAL:		91,200				\$37.85	\$37.85	\$480.38	
4	Urinals	151,200				\$62.75	\$62.75	\$509.18	
ECO4 TOTAL:		151,200				\$62.75	\$62.75	\$509.18	
5	Shower Heads	0			0	\$0.00	\$0.00	\$0.00	
ECO5 TOTAL:		0	0	0	0	\$0.00	\$0.00	\$0.00	
6	Equipment Related								
ECO6 TOTAL:		0	0	0	0	\$0.00	\$0.00	\$0.00	

SYSTEMS CORP

Systems Engineering and Management Corporation, Knoxville, TN

FY94S EEAP FT. KNOX WATER CONSERVATION STUDY

1002

DATE: 31 Oct 94

CALCULATION WORK SHEET 1

FACILITY NO.: 6537

FUNCTION: Administrative Facility

Operating Hours: 9

36

ECO Number ECO Type	Existing Fixture System		Retrofitted Fixture System		Usage HRS/YR	Fixtures Quantity	Water Leaks Eliminated LPY
	Description	LPM	Description	LPM			
1	Lavatory Sinks						
ECO1 TOTAL:		LPM		LPM	0	0	0
2	Misc. Sinks						
ECO2 TOTAL:		LPM		LPM	0	0	0
3	Floor Mounted Flush Valve	17	Install 3.5 GPF Flush Valve	13.2	2200	5	
Water Closets			Repair Kit				
ECO3 TOTAL:		LPM		LPM	#FL/YR	5	0
4	Wall Mounted Flush Valve	5.68	Install 1.0 GPF Flush Valve	3.79	10000	5	
Urinals			Repair Kit				
ECO4 TOTAL:		LPM		LPM	HRS/YR	5	0
5	Shower Heads						
ECO5 TOTAL:		LPM		LPM		0	0
6	Equipment Related						
ECO6 TOTAL:						0	0

SYSTEMS CORP

Systems Engineering and Management Corporation, Knoxville, TN

CALCULATION WORK SHEET 2

FACILITY NO.: 6537
 Water Rate: 0.42 \$/KL Energy Rate: \$/KWH
 Gas Rate: 10.51 \$/MWH Demand Rate: \$/KW

ECO Number	ECO Type	Annual Water		Annual Energy Saving			WATER		Total	
		Saving	LPY	ELEC KW	ELEC KWH	GAS MWH	Dollar Saving	Dollar Saving	Dollar Saving	Dollars Invested
1	Lavatory Sinks	0				0	\$0.00	\$0.00	\$0.00	\$0.00
		0				0	\$0.00	\$0.00	\$0.00	\$0.00
ECO1 TOTAL:		0		0	0	0	\$0.00	\$0.00	\$0.00	\$0.00
2	Misc. Sinks	0				0	\$0.00	\$0.00	\$0.00	\$0.00
ECO2 TOTAL:		0		0	0	0	\$0.00	\$0.00	\$0.00	\$0.00
3	Water Closets	41,800					\$17.35	\$17.35	\$17.35	\$300.24
ECO3 TOTAL:		41,800					\$17.35	\$17.35	\$17.35	\$300.24
4	Urinals	94,500					\$39.22	\$39.22	\$39.22	\$318.24
ECO4 TOTAL:		94,500					\$39.22	\$39.22	\$39.22	\$318.24
5	Shower Heads	0				0	\$0.00	\$0.00	\$0.00	\$0.00
ECO5 TOTAL:		0		0	0	0	\$0.00	\$0.00	\$0.00	\$0.00
6	Equipment Related									
ECO6 TOTAL:		0		0	0	0	\$0.00	\$0.00	\$0.00	\$0.00

SYSTEMS CORP

Systems Engineering and Management Corporation, Knoxville, TN

FY94S EEAP FT. KNOX WATER CONSERVATION STUDY										1 Oct 94	
CALCULATION WORK SHEET 1										DATE: 31 Oct 94	
FACILITY NO.:		6539		FUNCTION:		Enlisted Barracks					
Occupancy:		50		Operating Hours:		15					
ECO Number ECO Type	Existing Fixture System		Retrofited Fixture System		Usage HRS/YR	Fixtures Quantity	Water Leaks Eliminated LPY				
	Description	LPM	Description	LPM							
1	Public Lavatory	9.5	Spring Loaded Faucets	4.7	730	12					
	Private Lavatory	23	Spring Loaded Faucets	4.7	130	6					
ECO1 TOTAL:		LPM		LPM		18	0				
2	Laundry Sink	45	Install Aerators	9.5	2080	3					
Misc. Sinks											
ECO2 TOTAL:		LPF		LPF	#FL/YR	3	0				
3	Floor Mounted Flush Valve	17	Install 3.5 GPF Flush Valve	13.2	3000	16					
			Repair Kit								
Water Closets											
ECO3 TOTAL:		LPF		LPF	#FL/YR	16	0				
4	Wall Mounted Flush Valve	5.68	Install 1.0 GPF Flush Valve	3.79	10428	7					
			Repair Kit								
Urinals											
ECO4 TOTAL:		LPM		LPM	HRS/YR	7	0				
5	Shower Heads										
ECO5 TOTAL:		LPM		LPM		0	0				
6	Equipment										
	Related										
ECO6 TOTAL:						0	0				

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CALCULATION WORK SHEET 2

FACILITY NO.: 6539 Water Rate: 0.42 \$/KL Energy Rate: \$/KWH

Gas Rate: 10.51 \$/MWH Demand Rate: \$/KW

ECO Number	ECO Type	Annual Water		Annual Energy Saving			WATER		Total	
		Saving	LPY	ELEC KW	ELEC KWH	GAS MWH	Dollar Saving		Dollar Saving	Dollars Invested
1	Lavatory Sinks	3,140,460				7	\$1,303.29		\$1,378.74	\$2,937.60
		911,430				2	\$378.24		\$400.14	\$1,468.80
ECO1 TOTAL:		4,051,890		0	0	9	\$1,681.53		\$1,778.88	\$4,406.40
2	Misc. Sinks	13,291,200				30	\$55.16		\$374.46	\$29.09
ECO2 TOTAL:		13,291,200		0	0	30	\$55.16		\$374.46	\$29.09
3	Water Closets	182,400					\$75.70		\$75.70	\$960.77
ECO3 TOTAL:		182,400					\$75.70		\$75.70	\$960.77
4	Urinals	137,962					\$57.25		\$57.25	\$445.54
ECO4 TOTAL:		137,962					\$57.25		\$57.25	\$445.54
5	Shower Heads	0				0	\$0.00		\$0.00	\$0.00
ECO5 TOTAL:		0		0	0	0	\$0.00		\$0.00	\$0.00
6	Equipment Related									
ECO6 TOTAL:		0		0	0	0	\$0.00		\$0.00	\$0.00

SYSTEMS CORP

Systems Engineering and Management Corporation, Knoxville, TN

FY94S EEAP FT. KNOX WATER CONSERVATION STUDY										1002
CALCULATION WORK SHEET 1										DATE: 31 Oct 94
FACILITY NO. : 6541		FUNCTION: Enlisted Barracks								
Occupancy: 220		Operating Hours: 15								
ECO Number	ECO Type	Existing Fixture System		Retrofitted Fixture System		Usage	Fixtures	Water Leaks		
		Description	LPM	Description	LPM	HRS/YR	Quantity	Eliminated LPY		
1	Lavatory Sinks	Public Lavatory	9.5	Spring Loaded Faucets	4.7	730	30			
		Private Lavatory	9.5	Spring Loaded Faucets	4.7	130	2			
ECO1 TOTAL:			LPM		LPM		32	0		
2	Misc. Sinks	Laundry Sink	45	Install Aerators	9.5	2080	5			
ECO2 TOTAL:			LPF		LPF	#FL/YR	5	0		
3	Water Closets	Floor Mounted Flush Valve	17	Install 3.5 GPF Flush Valve	13.2	8000	22			
				Repair Kit						
ECO3 TOTAL:			LPF		LPF	#FL/YR	22	0		
4	Urinals	Wall Mounted Flush Valve	5.68	Install 1.0 GPF Flush Valve	3.79	20000	15			
				Repair Kit						
ECO4 TOTAL:			LPM		LPM	HRS/YR	15	0		
5	Shower Heads									
ECO5 TOTAL:			LPM		LPM		0	0		
6	Equipment Related									
ECO6 TOTAL:							0	0		

SYSTEMS CORP

Systems Engineering and Management Corporation, Knoxville, TN

CALCULATION WORK SHEET 2

FACILITY NO.: 6541
 Water Rate: 0.42 \$/KL Energy Rate: \$/KWH
 Gas Rate: 10.51 \$/MWH Demand Rate: \$/KW

ECO Number	Annual Water Saving LPY	Annual Energy Saving			WATER		Total	Total
ECO Type		ELEC KW	ELEC KWH	GAS MWH	Dollar Saving	Dollar Saving	Dollar Saving	Dollars Invested
1	7,851,150			18	\$3,258.23	\$3,446.84	\$7,344.00	
Lavatory Sinks	93,210			0	\$38.68	\$40.92	\$489.60	
ECO1 TOTAL:	7,944,360	0	0	18	\$3,296.91	\$3,487.76	\$7,833.60	
2	22,152,000			51	\$91.93	\$624.11	\$48.48	
Misc. Sinks								
ECO2 TOTAL:	22,152,000	0	0	51	\$91.93	\$624.11	\$48.48	
3	668,800				\$277.55	\$277.55	\$1,321.06	
Water Closets								
ECO3 TOTAL:	668,800				\$277.55	\$277.55	\$1,321.06	
4	567,000				\$235.30	\$235.30	\$954.72	
Urinals								
ECO4 TOTAL:	567,000				\$235.30	\$235.30	\$954.72	
5	0			0	\$0.00	\$0.00	\$0.00	
Shower Heads								
ECO5 TOTAL:	0	0	0	0	\$0.00	\$0.00	\$0.00	
6								
Equipment Related								
ECO6 TOTAL:	0	0	0	0	\$0.00	\$0.00	\$0.00	

SYSTEMS CORP

Systems Engineering and Management Corporation, Knoxville, TN

FY94S EEAP FT. KNOX WATER CONSERVATION STUDY

1 Oct 94

CALCULATION WORK SHEET 1

DATE: 29 Oct 94

FACILITY NO. : 6544

FUNCTION: Dining

Occupancy: 3 Meals / Day

Operating Hours:

ECO Number ECO Type	Existing Fixture System		Retrofited Fixture System		Usage HRS/YR	Fixtures Quantity	Water Leaks Eliminated LPY
	Description	LPM	Description	LPM			
1	Lavatory Sinks	9.5	Spring Loaded Faucets	4.7	730	21	
ECO1 TOTAL:		LPM		LPM		21	0
2	Misc. Sinks						
ECO2 TOTAL:		LPM		LPM			
3	Water Closets						
ECO3 TOTAL:		LPM		LPM		0	0
4	Floor Mounted Flush Valve	17	Install 3.5 GPF Flush Valve	13.2	10950	20	
			Repair Kit				
ECO4 TOTAL:		LPM		LPM		20	0
5	Wall Mounted Flush Valve	5.68	Install 1.0 GPF Flush Valve	3.79	10950	10	
			Repair Kit				
ECO5 TOTAL:		LPM		LPM		10	0
6	2 Comp. Sink (2 faucets)	17	Install Aerators	9.5	1460	1	
ECO6 TOTAL:						1	0

SYSTEMS CORP

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CALCULATION WORK SHEET 2

FACILITY NO.: 6544 Water Rate: 0.42 \$/KL Energy Rate: \$/KWH

Gas Rate: 10.51 \$/MWH Demand Rate: \$/KW

ECO Number	ECO Type	Annual Water		Annual Energy Saving			WATER		Total	
		Saving	LPY	ELEC KW	ELEC KWH	GAS MWH	Dollar Saving	Dollar Saving	Dollar Saving	Dollars Invested
1	Lavatory Sinks	5,495,805				8	\$2,280.76	\$2,369.88	\$4,284.00	
		0				0	\$0.00	\$0.00	\$0.00	
		0				0	\$0.00	\$0.00	\$0.00	
ECO1 TOTAL:		5,495,805		0	0	8	\$2,280.76	\$2,369.88	\$4,284.00	
2	Misc. Sinks	0				0	\$0.00	\$0.00	\$0.00	
		0				0	\$0.00	\$0.00	\$0.00	
		0				0	\$0.00	\$0.00	\$0.00	
ECO2 TOTAL:		0		0	0	0	\$0.00	\$0.00	\$0.00	
3	Water Closets	832,200					\$345.36	\$345.36	\$1,000.80	
		0					\$0.00	\$0.00	\$0.00	
		0					\$0.00	\$0.00	\$0.00	
ECO3 TOTAL:		832,200					\$345.36	\$345.36	\$1,000.80	
4	Urinals	206,955					\$85.89	\$85.89	\$530.40	
		0					\$0.00	\$0.00	\$0.00	
		0					\$0.00	\$0.00	\$0.00	
ECO4 TOTAL:		206,955					\$85.89	\$85.89	\$530.40	
5	Shower Heads	0				0	\$0.00	\$0.00	\$0.00	
		0				0	\$0.00	\$0.00	\$0.00	
		0				0	\$0.00	\$0.00	\$0.00	
ECO5 TOTAL:		0		0	0	0	\$0.00	\$0.00	\$0.00	
6	Equipment Related	657,000				1	\$2.73	\$13.38	\$8.08	
		0				0	\$0.00	\$0.00	\$0.00	
		0				0	\$0.00	\$0.00	\$0.00	
		0				0	\$0.00	\$0.00	\$0.00	
ECO6 TOTAL:		657,000		0	0	1	\$2.73	\$13.38	\$8.08	

SYSTEMS CORP

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FY94S EEAP FT. KNOX WATER CONSERVATION STUDY

1 Oct 94

CALCULATION WORK SHEET 1

DATE: 31 Oct 94

FACILITY NO.: 6546

FUNCTION: Enlisted Barracks

Occupancy: 220

Operating Hours: 15

ECO Number ECO Type	Existing Fixture System		Retrofited Fixture System		Usage HRS/YR	Fixtures Quantity	Water Leaks Eliminated LPY
	Description	LPM	Description	LPM			
1 Lavatory Sinks	Public Lavatory	9.5	Spring Loaded Faucets	4.7	730	30	
	Private Lavatory	28	Spring Loaded Faucets	4.7	130	1	
ECO1 TOTAL:		LPM		LPM		31	0
2 Misc. Sinks	Laundry Sink	23	Install Aerators	9.5	2080	4	
ECO2 TOTAL:		LPM		LPM		4	0
3 Water Closets	Floor Mounted Flush Valve	17	Install 3.5 GPF Flush Valve	13.2	8000	17	
			Repair Kit				
ECO3 TOTAL:		LPM		LPM		17	0
4 Urinals	Wall Mounted Flush Valve	5.68	Install 1.0 GPF Flush Valve	3.79	20000	8	
			Repair Kit				
ECO4 TOTAL:		LPM		LPM		8	0
5 Shower Heads							
ECO5 TOTAL:		LPM		LPM		0	0
6 Equipment Related							
ECO6 TOTAL:						0	0

SYSTEMS CORP

Systems Engineering and Management Corporation, Knoxville, TN

FY94S EEAP FT. KNOX WATER CONSERVATION STUDY 2 OF 2

CALCULATION WORK SHEET 2

FACILITY NO.: 6546 Water Rate: 0.42 \$/KL Energy Rate: \$/KWH

Gas Rate: 10.51 \$/MWH Demand Rate: \$/KW

ECO Number	Annual Water Saving LPY	Annual Energy Saving			WATER	Total	Total
ECO Type		ELEC KW	ELEC KWH	GAS MWH	Dollar Saving	Dollar Saving	Dollars Invested
1	7,851,150			18	\$3,258.23	\$3,446.84	\$7,344.00
Lavatory Sinks	190,905			0	\$79.23	\$83.81	\$244.80
ECO1 TOTAL:	8,042,055	0	0	18	\$3,337.45	\$3,530.65	\$7,588.80
2	6,739,200			15	\$27.97	\$189.87	\$38.78
Misc. Sinks							
ECO2 TOTAL:	6,739,200	0	0	15	\$27.97	\$189.87	\$38.78
3	516,800				\$214.47	\$214.47	\$1,020.82
Water Closets							
ECO3 TOTAL:	516,800				\$214.47	\$214.47	\$1,020.82
4	302,400				\$125.50	\$125.50	\$509.18
Urinals							
ECO4 TOTAL:	302,400				\$125.50	\$125.50	\$509.18
5	0			0	\$0.00	\$0.00	\$0.00
Shower Heads							
ECO5 TOTAL:	0	0	0	0	\$0.00	\$0.00	\$0.00
6							
Equipment Related							
ECO6 TOTAL:	0	0	0	0	\$0.00	\$0.00	\$0.00

SYSTEMS CORP

Systems Engineering and Management Corporation, Knoxville, TN

FY94S EEAP FT. KNOX WATER CONSERVATION STUDY

1002

CALCULATION WORK SHEET 1

DATE: 31 Oct 94

FACILITY NO.: 6568

FUNCTION:

Self Sv. Sup. Ctr.

Occupancy: 20

Operating Hours: 3

ECO Number ECO Type	Existing Fixture System		Retrofited Fixture System		Usage HRS/YR	Fixtures Quantity	Water Leaks Eliminated LPY
	Description	LPM	Description	LPM			
1 Lavatory Sinks	Public Lavatory	9.5	Spring Loaded Faucets	4.7	52	4	
	Public Lavatory	23	Spring Loaded Faucets	4.7	52	3	
ECO1 TOTAL:		LPM		LPM		7	0
2 Misc. Sinks	Service Sink	23	Install Aerators	9.5	52	2	
ECO2 TOTAL:		LPM		LPM		2	0
3 Water Closets	Floor Mounted Flush Valve	17	Install 3.5 GPF Flush Valve	13.2	2200	7	
			Repair Kit				
ECO3 TOTAL:		LPM		LPM		7	0
4 Urinals	Wall Mounted Flush Valve	5.68	Install 1.0 GPF Flush Valve	3.79	7000	4	
			Repair Kit				
ECO4 TOTAL:		LPM		LPM		4	0
5 Shower Heads							
ECO5 TOTAL:		LPM		LPM		0	0
6 Equipment Related							
ECO6 TOTAL:						0	0

SYSTEMS CORP

Systems Engineering and Management Corporation, Knoxville, TN

CALCULATION WORK SHEET 2

FACILITY NO.: 6568 Water Rate: 0.42 \$/KL Energy Rate: \$/KWH

Gas Rate: 10.51 \$/MWH Demand Rate: \$/KW

ECO Number	ECO Type	Annual Water		Annual Energy Saving			WATER		Total	
		Saving	LPY	ELEC KW	ELEC KWH	GAS MWH	Dollar Saving	Dollar Saving	Dollar Saving	Dollars Invested
1	Lavatory Sinks	74,568				0	\$30.95	\$32.74	\$979.20	
		182,286				0	\$75.65	\$80.03	\$734.40	
ECO1 TOTAL:		256,854		0	0	1	\$106.59	\$112.77	\$1,713.60	
2	Misc. Sinks	84,240				0	\$0.35	\$0.37	\$19.39	
ECO2 TOTAL:		84,240		0	0	0	\$0.35	\$0.37	\$19.39	
3	Water Closets	58,520					\$24.29	\$24.29	\$420.34	
ECO3 TOTAL:		58,520					\$24.29	\$24.29	\$420.34	
4	Urinals	52,920					\$21.96	\$21.96	\$254.59	
ECO4 TOTAL:		52,920					\$21.96	\$21.96	\$254.59	
5	Shower Heads	0				0	\$0.00	\$0.00	\$0.00	
ECO5 TOTAL:		0		0	0	0	\$0.00	\$0.00	\$0.00	
6	Equipment Related									
ECO6 TOTAL:		0		0	0	0	\$0.00	\$0.00	\$0.00	

SYSTEMS CORP

Systems Engineering and Management Corporation, Knoxville, TN

FY94S EEAP FT. KNOX WATER CONSERVATION STUDY

1002

CALCULATION WORK SHEET 1

DATE: 31 Oct 94

FACILITY NO.: 6571

FUNCTION:

Admin. Fac.

Occupancy:

Operating Hours:

8

ECO Number ECO Type	Existing Fixture System		Retrofited Fixture System		Usage HRS/YR	Fixtures Quantity	Water Leaks Eliminated LPY
	Description	LPM	Description	LPM			
1	Public Lavatory	9.5	Spring Loaded Faucets	4.7	130	3	
Lavatory Sinks							
ECO1 TOTAL:		LPM		LPM		3	0
2							
Misc. Sinks							
ECO2 TOTAL:		LPM		LPM			
3	Floor Mounted Flush Valve	17	Install 3.5 GPF Flush Valve	13.2	2200	3	
Water Closets							
			Repair Kit				
ECO3 TOTAL:		LPM		LPM		3	0
4	Wall Mounted Flush Valve	5.68	Install 1.0 GPF Flush Valve	3.79	5460	4	
Urinals							
			Repair Kit				
ECO4 TOTAL:		LPM		LPM		4	0
5							
Shower Heads							
ECO5 TOTAL:		LPM		LPM		0	0
6							
Equipment Related							
ECO6 TOTAL:						0	0

SYSTEMS CORP

Systems Engineering and Management Corporation, Knoxville, TN

CALCULATION WORK SHEET 2

FACILITY NO.: 6571 Water Rate: 0.42 \$/KL Energy Rate: \$/KWH

Gas Rate: 10.51 \$/MWH Demand Rate: \$/KW

ECO Number	ECO Type	Annual Water		Annual Energy Saving			WATER		Total	
		Saving	LPY	ELEC KW	ELEC KWH	GAS MWH	Dollar Saving		Dollar Saving	Dollars Invested
1	Lavatory Sinks	139,815				0	\$58.02		\$61.38	\$734.40
		0				0	\$0.00		\$0.00	\$0.00
ECO1 TOTAL:		139,815		0	0	0	\$58.02		\$61.38	\$734.40
2	Misc. Sinks	0				0	\$0.00		\$0.00	\$0.00
ECO2 TOTAL:		0		0	0	0	\$0.00		\$0.00	\$0.00
3	Water Closets	25,080					\$10.41		\$10.41	\$180.14
ECO3 TOTAL:		25,080					\$10.41		\$10.41	\$180.14
4	Urinals	41,278					\$17.13		\$17.13	\$254.59
ECO4 TOTAL:		41,278					\$17.13		\$17.13	\$254.59
5	Shower Heads	0				0	\$0.00		\$0.00	\$0.00
ECO5 TOTAL:		0		0	0	0	\$0.00		\$0.00	\$0.00
6	Equipment Related									
ECO6 TOTAL:		0		0	0	0	\$0.00		\$0.00	\$0.00

SYSTEMS CORP

Systems Engineering and Management Corporation, Knoxville, TN

FY94S EEAP FT. KNOX WATER CONSERVATION STUDY

1002

CALCULATION WORK SHEET 1

DATE: 31 Oct 94

FACILITY NO.: 6574

FUNCTION:

NBC Defence

Occupancy: 50

Operating Hours:

8

ECO Number ECO Type	Existing Fixture System		Retrofited Fixture System		Usage HRS/YR	Fixtures Quantity	Water Leaks Eliminated LPY
	Description	LPM	Description	LPM			
1	Public Lavatory	27	Spring Loaded Faucets	4.7	130	3	15800
Lavatory Sinks							
ECO1 TOTAL:		LPM		LPM		3	15800
2							
Misc. Sinks							
ECO2 TOTAL:		LPF		LPF	#FL/YR	0	0
3	Floor Mounted Flush Valve	17	Install 3.5 GPF Flush Valve	13.2	1500	12	
Water Closets							
			Repair Kit				
ECO3 TOTAL:		LPF		LPF	#FL/YR	12	0
4	Wall Mounted Flush Valve	5.68	Install 1.0 GPF Flush Valve	3.79	9000	8	
Urinals							
			Repair Kit				
ECO4 TOTAL:		LPM		LPM	HRS/YR	8	0
5							
Shower Heads							
ECO5 TOTAL:		LPM		LPM		0	0
6							
Equipment Related							
ECO6 TOTAL:						0	0

SYSTEMS CORP

Systems Engineering and Management Corporation, Knoxville, TN

CALCULATION WORK SHEET 2

FACILITY NO.: 6574
 Water Rate: 0.42 \$/KL Energy Rate: \$/KWH
 Gas Rate: 10.51 \$/MWH Demand Rate: \$/KW

ECO Number	Annual Water Saving LPY	Annual Energy Saving			WATER		Total	Total
ECO Type		ELEC KW	ELEC KWH	GAS MWH	Dollar Saving	Dollar Saving	Dollar Saving	Dollars Invested
1 Lavatory Sinks	565,115 0			1 0	\$234.52 \$0.00	\$248.10 \$0.00	\$734.40 \$0.00	
ECO1 TOTAL:	565,115 0	0	0	1 0	\$234.52 \$0.00	\$248.10 \$0.00	\$734.40 \$0.00	
2 Misc. Sinks								
ECO2 TOTAL:	0 68,400	0	0	0	\$0.00 \$28.39	\$0.00 \$28.39	\$0.00 \$720.58	
3 Water Closets								
ECO3 TOTAL:	68,400 136,080				\$28.39 \$56.47	\$28.39 \$56.47	\$720.58 \$509.18	
4 Urinals								
ECO4 TOTAL:	136,080 0			0	\$56.47 \$0.00	\$56.47 \$0.00	\$509.18 \$0.00	
5 Shower Heads								
ECO5 TOTAL:	0 6	0	0	0	\$0.00 \$0.00	\$0.00 \$0.00	\$0.00 \$0.00	
6 Equipment Related								
ECO6 TOTAL:	0	0	0	0	\$0.00	\$0.00	\$0.00	\$0.00

SYSTEMS CORP

Systems Engineering and Management Corporation, Knoxville, TN

FY94S EEAP FT. KNOX WATER CONSERVATION STUDY

1002

CALCULATION WORK SHEET 1

DATE: 31 Oct 94

FACILITY NO.: 6581

FUNCTION:

Admin Facility

Occupancy: 300

Operating Hours: 14

ECO Number ECO Type	Existing Fixture System		Retrofitted Fixture System		Usage HRS/YR	Fixtures Quantity	Water Leaks Eliminated LPY
	Description	LPM	Description	LPM			
1	Public Lavatory	9.5	Spring Loaded Faucets	4.7	130	30	
	Public Lavatory	17	Spring Loaded Faucets	4.7	130	16	
ECO1 TOTAL:		LPM		LPM		46	0
2	Laundry Sink	19	Install Aerators	9.5	130	8	
Misc. Sinks							
ECO2 TOTAL:		LPF		LPF	#FL/YR	8	0
3	Floor Mounted Flush Valve	17	Install 3.5 GPF Flush Valve	13.2	2340	34	
Water Closets			Repair Kit				
ECO3 TOTAL:		LPF		LPF	#FL/YR	34	0
4	Wall Mounted Flush Valve	5.68	Install 1.0 GPF Flush Valve	3.79	7020	24	
Urinals			Repair Kit				
ECO4 TOTAL:		LPM		LPM	HRS/YR	24	0
5							
Shower Heads							
ECO5 TOTAL:		LPM		LPM		0	0
6							
Equipment Related							
ECO6 TOTAL:						0	0

SYSTEMS CORP

Systems Engineering and Management Corporation, Knoxville, TN

CALCULATION WORK SHEET 2

FACILITY NO.: 6581 Water Rate: 0.42 \$/KL Energy Rate: \$/KWH

Gas Rate: 10.51 \$/MWH Demand Rate: \$/KW

ECO Number	Annual Water Saving LPY	Annual Energy Saving			WATER		Total	
		ELEC KW	ELEC KWH	GAS MWH	Dollar Saving	Dollar Saving	Dollar Saving	Dollars Invested
1	1,398,150			3	\$580.23	\$613.82	\$7,344.00	
Lavatory Sinks	1,681,680			4	\$697.90	\$738.30	\$3,916.80	
ECO1 TOTAL:	3,079,830	0	0	7	\$1,278.13	\$1,352.12	\$11,260.80	
2	592,800			1	\$2.46	\$2.60	\$77.57	
Misc. Sinks								
ECO2 TOTAL:	592,800	0	0	1	\$2.46	\$2.60	\$77.57	
3	302,328				\$125.47	\$125.47	\$2,041.63	
Water Closets								
ECO3 TOTAL:	302,328				\$125.47	\$125.47	\$2,041.63	
4	318,427				\$132.15	\$132.15	\$1,527.55	
Urinals								
ECO4 TOTAL:	318,427				\$132.15	\$132.15	\$1,527.55	
5	0			0	\$0.00	\$0.00	\$0.00	
Shower Heads								
ECO5 TOTAL:	0	0	0	0	\$0.00	\$0.00	\$0.00	
6								
Equipment Related								
ECO6 TOTAL:	0	0	0	0	\$0.00	\$0.00	\$0.00	

SYSTEMS CORP

Systems Engineering and Management Corporation, Knoxville, TN

FY94S EEAP FT. KNOX WATER CONSERVATION STUDY

1002

DATE: 31 Oct 94

CALCULATION WORK SHEET 1

FUNCTION: Troop Processing

FACILITY NO.: 6590

Operating Hours: 8

Occupancy: 50 (and 400 Troops)

ECO Number ECO Type	Existing Fixture System		Retrofitted Fixture System		Usage HRS/YR	Fixtures Quantity	Water Leaks Eliminated LPY
	Description	LPM	Description	LPM			
1	Public Lavatory	9.5	Spring Loaded Faucets	4.7	130	1	
	Public Lavatory	15	Spring Loaded Faucets	4.7	130	9	
ECO1 TOTAL:		LPM		LPM		10	0
2							
Misc. Sinks							
ECO2 TOTAL:		LPF		LPF	#FL/YR	0	0
3	Floor Mounted Flush Valve	17	Install 3.5 GPF Flush Valve	13.2	6000	10	
Water Closets			Repair Kit				
ECO3 TOTAL:		LPF		LPF	#FL/YR	10	0
4	Wall Mounted Flush Valve	5.68	Install 1.0 GPF Flush Valve	3.79	11700	4	
Urinals			Repair Kit				
ECO4 TOTAL:		LPM		LPM	HRS/YR	4	0
5							
Shower Heads							
ECO5 TOTAL:		LPM		LPM		0	0
6							
Equipment Related							
ECO6 TOTAL:						0	0

SYSTEMS CORP

Systems Engineering and Management Corporation, Knoxville, TN

CALCULATION WORK SHEET 2

FACILITY NO.: 6590 Water Rate: 0.42 \$/KL Energy Rate: \$/KWH

Gas Rate: 10.51 \$/MWH Demand Rate: \$/KW

ECO Number	ECO Type	Annual Water		Annual Energy Saving			WATER		Total	
		Saving	LPY	ELEC KW	ELEC KWH	GAS MWH	Dollar Saving	Dollar Saving	Dollar Saving	Dollars Invested
1	Lavatory Sinks	46,605				0	\$19.34	\$20.46	\$244.80	
		805,545				2	\$334.30	\$353.65	\$2,203.20	
ECO1 TOTAL:		852,150		0	0	2	\$353.64	\$374.11	\$2,448.00	
2	Misc. Sinks	0				0	\$0.00	\$0.00	\$0.00	
ECO2 TOTAL:		0		0	0	0	\$0.00	\$0.00	\$0.00	
3	Water Closets	228,000					\$94.62	\$94.62	\$600.48	
ECO3 TOTAL:		228,000					\$94.62	\$94.62	\$600.48	
4	Urinals	88,452					\$36.71	\$36.71	\$254.59	
ECO4 TOTAL:		88,452					\$36.71	\$36.71	\$254.59	
5	Shower Heads	0				0	\$0.00	\$0.00	\$0.00	
ECO5 TOTAL:		0		0	0	0	\$0.00	\$0.00	\$0.00	
6	Equipment Related									
ECO6 TOTAL:		0		0	0	0	\$0.00	\$0.00	\$0.00	

SYSTEMS CORP

Systems Engineering and Management Corporation, Knoxville, TN

FY94S EEAP FT. KNOX WATER CONSERVATION STUDY

10/2

CALCULATION WORK SHEET 1

DATE: 29 Oct 94

FACILITY NO.: 6592

FUNCTION: Maintenance

Occupancy:

Operating Hours: 8

ECO Number ECO Type	Existing Fixture System		Retrofited Fixture System		Usage HRS/YR	Fixtures Quantity	Water Leaks Eliminated LPY
	Description	LPM	Description	LPM			
1	Lavatory Sinks						
ECO1 TOTAL:		LPM		LPM	0	0	0
2	Misc. Sinks						0
ECO2 TOTAL:		LPM		LPM	0	0	
3	Water Closets						
	Floor Mounted Flush Valve	17	Install 3.5 GPF Flush Valve	13.2	3000	2	
			Repair Kit				
ECO3 TOTAL:		LPM		LPM	18250	2	0
4	Urinals					1	
	Wall Mounted Flush Valve	5.68	Install 1.0 GPF Flush Valve	3.79	18250		
			Repair Kit				
ECO4 TOTAL:		LPM		LPM	HRS/YR	1	0
5	Shower Heads						0
ECO5 TOTAL:		LPM		LPM		0	0
6	Equipment Related						
ECO6 TOTAL:						0	0

SYSTEMS CORP

Systems Engineering and Management Corporation, Knoxville, TN

CALCULATION WORK SHEET 2

FACILITY NO.: 6592 Water Rate: 0.42 \$/KL Energy Rate: \$/KWH

Gas Rate: 10.51 \$/MWH Demand Rate: \$/KW

ECO Number	ECO Type	Annual Water		Annual Energy Saving			WATER		Total	
		Saving	LPY	ELEC KW	ELEC KWH	GAS MWH	Dollar Saving	Dollar Saving	Dollar Saving	Dollars Invested
1	Lavatory Sinks	0				0	\$0.00	\$0.00	\$0.00	\$0.00
		0				0	\$0.00	\$0.00	\$0.00	\$0.00
		0				0	\$0.00	\$0.00	\$0.00	\$0.00
ECO1 TOTAL:		0		0	0	0	\$0.00	\$0.00	\$0.00	\$0.00
2	Misc. Sinks	0				0	\$0.00	\$0.00	\$0.00	\$0.00
		0				0	\$0.00	\$0.00	\$0.00	\$0.00
		0				0	\$0.00	\$0.00	\$0.00	\$0.00
ECO2 TOTAL:		0		0	0	0	\$0.00	\$0.00	\$0.00	\$0.00
3	Water Closets	22,800					\$9.46	\$9.46	\$9.46	\$120.10
		0					\$0.00	\$0.00	\$0.00	\$0.00
		0					\$0.00	\$0.00	\$0.00	\$0.00
ECO3 TOTAL:		22,800					\$9.46	\$9.46	\$9.46	\$120.10
4	Urinals	34,493					\$14.31	\$14.31	\$14.31	\$63.65
		0					\$0.00	\$0.00	\$0.00	\$0.00
		0					\$0.00	\$0.00	\$0.00	\$0.00
ECO4 TOTAL:		34,493					\$14.31	\$14.31	\$14.31	\$63.65
5	Shower Heads	0				0	\$0.00	\$0.00	\$0.00	\$0.00
		0				0	\$0.00	\$0.00	\$0.00	\$0.00
		0				0	\$0.00	\$0.00	\$0.00	\$0.00
ECO5 TOTAL:		0		0	0	0	\$0.00	\$0.00	\$0.00	\$0.00
6	Equipment Related	0				0	\$0.00	\$0.00	\$0.00	\$0.00
		0				0	\$0.00	\$0.00	\$0.00	\$0.00
		0				0	\$0.00	\$0.00	\$0.00	\$0.00
ECO6 TOTAL:		0		0	0	0	\$0.00	\$0.00	\$0.00	\$0.00

SYSTEMS CORP

Systems Engineering and Management Corporation, Knoxville, TN

FY94S EEAP FT. KNOX WATER CONSERVATION STUDY

1002

CALCULATION WORK SHEET 1

DATE: 31 Oct 94

FACILITY NO. : 6597

FUNCTION:

Officers Quarters
Transient

Occupancy: 370

Operating Hours: 24

ECO Number ECO Type	Existing Fixture System		Retrofited Fixture System		Usage HRS/YR	Fixtures Quantity	Water Leaks Eliminated LPY
	Description	LPM	Description	LPM			
1 Lavatory Sinks	Public Lavatory	9.5	Spring Loaded Faucets	4.7	130	2	
	Private Lavatory	9.5	Spring Loaded Faucets	4.7	280	78	
ECO1 TOTAL:		LPM		LPM		80	0
2 Misc. Sinks							
ECO2 TOTAL:		LPF		LPF	#FL/YR	0	0
3 Water Closets	Floor Mounted Flush Valve	17	Install 3.5 GPF Flush Valve Repair Kit	13.2	9000	82	
ECO3 TOTAL:		LPF		LPF	#FL/YR	82	0
4 Urinals							
ECO4 TOTAL:		LPM		LPM	HRS/YR	0	0
5 Shower Heads							
ECO5 TOTAL:		LPM		LPM		0	0
6 Equipment Related							
ECO6 TOTAL:						0	0

SYSTEMS CORP

Systems Engineering and Management Corporation, Knoxville, TN

CALCULATION WORK SHEET 2

FACILITY NO.: 6597
 Water Rate: 0.42 \$/KL Energy Rate: \$/KWH
 Gas Rate: 10.51 \$/MWH Demand Rate: \$/KW

ECO Number	ECO Type	Annual Water		Annual Energy Saving			WATER		Total	
		Saving	LPY	ELEC KW	ELEC KWH	GAS MWH	Dollar Saving	Dollar Saving	Dollar Saving	Dollars Invested
1	Lavatory Sinks	93,210				0	\$38.68	\$40.92	\$489.60	
		7,829,640				18	\$3,249.30	\$3,437.40	\$19,094.40	
ECO1 TOTAL:		7,922,850		0	0	18	\$3,287.98	\$3,478.32	\$19,584.00	
2	Misc. Sinks	0				0	\$0.00	\$0.00	\$0.00	
ECO2 TOTAL:		0		0	0	0	\$0.00	\$0.00	\$0.00	
3	Water Closets	2,804,400					\$1,163.83	\$1,163.83	\$4,923.94	
ECO3 TOTAL:		2,804,400					\$1,163.83	\$1,163.83	\$4,923.94	
4	Urinals	0					\$0.00	\$0.00	\$0.00	
ECO4 TOTAL:		0					\$0.00	\$0.00	\$0.00	
5	Shower Heads	0				0	\$0.00	\$0.00	\$0.00	
ECO5 TOTAL:		0		0	0	0	\$0.00	\$0.00	\$0.00	
6	Equipment Related									
ECO6 TOTAL:		0		0	0	0	\$0.00	\$0.00	\$0.00	

SYSTEMS CORP

Systems Engineering and Management Corporation, Knoxville, TN

FY94S EEAP FT. KNOX WATER CONSERVATION STUDY										1002
CALCULATION WORK SHEET 1										DATE: 31 Oct 94
FACILITY NO. : 6607		FUNCTION: Gym								
Occupancy:		Operating Hours: Morning PT								
ECO Number	ECO Type	Existing Fixture System	Description	Retrofitted Fixture System	Usage HRS/YR	Fixtures Quantity	Water Leaks Eliminated LPY			
1	Lavatory Sinks	Public Lavatory		Spring Loaded Faucets	4.7	65	6			
ECO1 TOTAL:	2				LPM		6	0		
Misc. Sinks										
ECO2 TOTAL:	3				LPF	#FL/YR	0	0		
Water Closets		Floor Mounted Flush Valve	17	Install 3.5 GPF Flush Valve	13.2	1300	6			
				Repair Kit						
ECO3 TOTAL:	4				LPF	#FL/YR	6	0		
Urinals		Wall Mounted Flush Valve	5.68	Install 1.0 GPF Flush Valve	3.79	1300	6			
				Repair Kit						
ECO4 TOTAL:	5				LPM	HRS/YR	6	0		
Shower Heads										
ECO5 TOTAL:	6				LPM		0	0		
Equipment Related										
ECO6 TOTAL:							0	0		

CALCULATION WORK SHEET 2

FACILITY NO.: 6607 Water Rate: 0.42 \$/KL Energy Rate: \$/KWH
 Gas Rate: 10.51 \$/MWH Demand Rate: \$/KW

ECO Number ECO Type	Annual Water Saving LPY	Annual Energy Saving			WATER Dollar Saving	Total Dollar Saving	Total Dollars Invested
		ELEC KW	ELEC KWH	GAS MWH			
1 Lavatory Sinks	268,515			1	\$111.43	\$117.88	\$1,468.80
ECO1 TOTAL:	268,515	0	0	1	\$111.43	\$117.88	\$1,468.80
2 Misc. Sinks	0			0	\$0.00	\$0.00	\$0.00
ECO2 TOTAL:	0	0	0	0	\$0.00	\$0.00	\$0.00
3 Water Closets	29,640				\$12.30	\$12.30	\$360.29
ECO3 TOTAL:	29,640				\$12.30	\$12.30	\$360.29
4 Urinals	14,742				\$6.12	\$6.12	\$381.89
ECO4 TOTAL:	14,742				\$6.12	\$6.12	\$381.89
5 Shower Heads	0			0	\$0.00	\$0.00	\$0.00
ECO5 TOTAL:	0	0	0	0	\$0.00	\$0.00	\$0.00
6 Equipment Related							
ECO6 TOTAL:	0	0	0	0	\$0.00	\$0.00	\$0.00

SYSTEMS CORP

Systems Engineering and Management Corporation, Knoxville, TN

FY94S EEAP FT. KNOX WATER CONSERVATION STUDY

1002

CALCULATION WORK SHEET 1

DATE: 31 Oct 94

FUNCTION: Clothing & Sales

FACILITY NO.: 6611

Operating Hours: 8

4

Occupancy:

ECO Number ECO Type	Existing Fixture System		Retrofited Fixture System		Usage HRS/YR	Fixtures Quantity	Water Leaks Eliminated LPY
	Description	LPM	Description	LPM			
1	Public Lavatory	9.5	Spring Loaded Faucets	4.7	130	4	
Lavatory Sinks							
ECO1 TOTAL:		LPM		LPM		4	0
2							
Misc. Sinks							
ECO2 TOTAL:		LPF		LPF	#FL/YR	0	0
3	Floor Mounted Flush Valve	17	Install 3.5 GPF Flush Valve	13.2	1300	3	
Water Closets							
			Repair Kit				
ECO3 TOTAL:		LPF		LPF	#FL/YR	3	0
4	Wall Mounted Flush Valve	5.68	Install 1.0 GPF Flush Valve	3.79	1300	1	
Urinals							
			Repair Kit				
ECO4 TOTAL:		LPM		LPM	HRS/YR	1	0
5							
Shower Heads							
ECO5 TOTAL:		LPM		LPM		0	0
6							
Equipment Related							
ECO6 TOTAL:						0	0

SYSTEMS CORP

Systems Engineering and Management Corporation, Knoxville, TN

CALCULATION WORK SHEET 2

FACILITY NO.: 6611 Water Rate: 0.42 \$/KL Energy Rate: \$/KWH

Gas Rate: 10.51 \$/MWH Demand Rate: \$/KW

ECO Number	ECO Type	Annual Water Saving LPY	Annual Energy Saving			WATER		Total	
			ELEC KW	ELEC KWH	GAS MWH	Dollar Saving	Dollar Saving	Dollar Saving	Dollars Invested
1	Lavatory Sinks	186,420			0	\$77.36	\$81.84	\$979.20	
		0			0	\$0.00	\$0.00	\$0.00	
ECO1 TOTAL:		186,420	0	0	0	\$77.36	\$81.84	\$979.20	
2	Misc. Sinks				0	\$0.00	\$0.00	\$0.00	
ECO2 TOTAL:		0	0	0	0	\$0.00	\$0.00	\$0.00	
3	Water Closets	14,820				\$6.15	\$6.15	\$180.14	
ECO3 TOTAL:		14,820				\$6.15	\$6.15	\$180.14	
4	Urinals	2,457				\$1.02	\$1.02	\$63.65	
ECO4 TOTAL:		2,457				\$1.02	\$1.02	\$63.65	
5	Shower Heads	0			0	\$0.00	\$0.00	\$0.00	
ECO5 TOTAL:		0	0	0	0	\$0.00	\$0.00	\$0.00	
6	Equipment Related								
ECO6 TOTAL:		0	0	0	0	\$0.00	\$0.00	\$0.00	

SYSTEMS CORP

Systems Engineering and Management Corporation, Knoxville, TN

FY94S EEAP FT. KNOX WATER CONSERVATION STUDY

1002

CALCULATION WORK SHEET 1

DATE: 31 Oct 94

FACILITY NO.: 6616

FUNCTION: Training Building

6

Operating Hours: 11

Occupancy:

ECO Number ECO Type	Existing Fixture System		Retrofited Fixture System		Usage HRS/YR	Fixtures Quantity	Water Leaks Eliminated LPY
	Description	LPM	Description	LPM			
1	Public Lavatory	9.5	Spring Loaded Faucets	4.7	130	1	15800
Lavatory Sinks							
ECO1 TOTAL:		LPM		LPM		1	15800
2							
Misc. Sinks							
ECO2 TOTAL:		LPF		LPF	#FL/YR	0	0
3	Tank Type (public)	11.4	Install 1.6 GPF Tank Type	6	2100	1	
Water Closets							
ECO3 TOTAL:		LPF		LPF	#FL/YR	1	0
4	Wall Mounted Flush Valve	5.68	Install 1.0 GPF Flush Valve	3.79	8000	1	
Urinals							
			Repair Kit				
ECO4 TOTAL:		LPM		LPM	HRS/YR	1	0
5							
Shower Heads							
ECO5 TOTAL:		LPM		LPM		0	0
6							
Equipment Related							
ECO6 TOTAL:						0	0

SYSTEMS CORP

Systems Engineering and Management Corporation, Knoxville, TN

CALCULATION WORK SHEET 2

FACILITY NO.: 6616 Water Rate: 0.42 \$/KL Energy Rate: \$/KWH

Gas Rate: 10.51 \$/MWH Demand Rate: \$/KW

ECO Number	Annual Water Saving	LPY	ELEC KW	Annual Energy Saving	ELEC KWH	GAS MWH	WATER Dollar Saving	Total Dollar Saving	Total Dollars Invested
ECO Type	1	62,405				0	\$25.90	\$27.40	\$244.80
Lavatory Sinks	0					0	\$0.00	\$0.00	\$0.00
ECO1 TOTAL:	62,405		0	0	0	0	\$25.90	\$27.40	\$244.80
Misc. Sinks	0					0	\$0.00	\$0.00	\$0.00
ECO2 TOTAL:	0		0	0	0	0	\$0.00	\$0.00	\$0.00
3	11,340						\$4.71	\$4.71	\$419.16
Water Closets									
ECO3 TOTAL:	11,340						\$4.71	\$4.71	\$419.16
4	15,120					0	\$6.27	\$6.27	\$419.16
Urinals									
ECO4 TOTAL:	15,120					0	\$6.27	\$6.27	\$419.16
5	0					0	\$0.00	\$0.00	\$63.65
Shower Heads									
ECO5 TOTAL:	0		0	0	0	0	\$0.00	\$0.00	\$63.65
6									
Equipment Related									
ECO6 TOTAL:	0		0	0	0	0	\$0.00	\$0.00	\$0.00

SYSTEMS CORP

Systems Engineering and Management Corporation, Knoxville, TN

FY94S EEAP FT. KNOX WATER CONSERVATION STUDY										1002
CALCULATION WORK SHEET 1										DATE: 31 Oct 94
FACILITY NO. : 6617		FUNCTION: Training Building								
Occupancy: 10		Operating Hours: 12								
ECO Number	ECO Type	Existing Fixture System		Retrofitted Fixture System		Usage	Fixtures	Water Leaks		
		Description	LPM	Description	LPM	HRS/YR	Quantity	Eliminated LPM	Eliminated LPY	
1	Lavatory Sinks	Public Lavatory	9.5	Spring Loaded Faucets	4.7	130	2	15800		
ECO1 TOTAL:	2		LPM		LPM		2	15800		
	Misc. Sinks									
ECO2 TOTAL:	3		LPM							
	Water Closets	Tank Type (public)	11.4	Install 1.6 GPF Tank Type	6	1800	2	0		
				Water Closet						
ECO3 TOTAL:	4		LPM				2	0		
	Urinals	Wall Mounted Flush Valve	5.68	Install 1.0 GPF Flush Valve	3.79	12000	1			
				Repair Kit						
ECO4 TOTAL:	5		LPM				1	0		
	Shower Heads									
ECO5 TOTAL:	6		LPM				0	0		
	Equipment Related									
ECO6 TOTAL:							0	0		

CALCULATION WORK SHEET 2

FACILITY NO.: 6617
 Water Rate: 0.42 \$/KL Energy Rate: \$/KWH
 Gas Rate: 10.51 \$/MWH Demand Rate: \$/KW

ECO Number	Annual Water Saving LPY	Annual Energy Saving			WATER		Total	Total
ECO Type		ELEC KW	ELEC KWH	GAS MWH	Dollar Saving	Dollar Saving	Dollar Saving	Dollars Invested
1 Lavatory Sinks	109,010 0			0 0	\$45.24 \$0.00	\$47.86 \$0.00	\$489.60 \$0.00	
ECO1 TOTAL:	109,010	0	0	0	\$45.24	\$47.86	\$489.60	
2 Misc. Sinks	0			0	\$0.00	\$0.00	\$0.00	
ECO2 TOTAL:	0	0	0	0	\$0.00	\$0.00	\$0.00	
3 Water Closets	19,440				\$8.07	\$8.07	\$838.32	
ECO3 TOTAL:	19,440				\$8.07	\$8.07	\$838.32	
4 Urinals	22,680				\$9.41	\$9.41	\$63.65	
ECO4 TOTAL:	22,680				\$9.41	\$9.41	\$63.65	
5 Shower Heads	0			0	\$0.00	\$0.00	\$0.00	
ECO5 TOTAL:	0	0	0	0	\$0.00	\$0.00	\$0.00	
6 Equipment Related								
ECO6 TOTAL:	0	0	0	0	\$0.00	\$0.00	\$0.00	

SYSTEMS CORP

Systems Engineering and Management Corporation, Knoxville, TN

FY94S EEAP FT. KNOX WATER CONSERVATION STUDY										1002
CALCULATION WORK SHEET 1										DATE: 31 Oct 94
FACILITY NO.: 6620		FUNCTION: Performing Arts								
Occupancy:		Operating Hours:								
ECO Number ECO Type	Existing Fixture System		Retrofited Fixture System		Usage HRS/YR	Fixtures Quantity	Water Leaks Eliminated LPY			
	Description	LPM	Description	LPM						
1	Public Lavatory	9.5	Spring Loaded Faucets	4.7	130	6				
Lavatory Sinks										
ECO1 TOTAL:		LPM		LPM		6	0			
2										
Misc. Sinks										
ECO2 TOTAL:										
3	Floor Mounted Flush Valve	17	Install 3.5 GPF Flush Valve	13.2	1300	6	0			
Water Closets										
			Repair Kit							
ECO3 TOTAL:		LPF		LPF	#FL/YR	0	0			
4	Wall Mounted Flush Valve	5.68	Install 1.0 GPF Flush Valve	3.79	1300	2				
Urinals										
			Repair Kit							
ECO4 TOTAL:		LPM		LPM	HRS/YR	2	0			
5										
Shower Heads										
ECO5 TOTAL:		LPM		LPM		0	0			
6										
Equipment										
Related										
ECO6 TOTAL:						0	0			

CALCULATION WORK SHEET 2

FACILITY NO.: 6620 Water Rate: 0.42 \$/KL Energy Rate: \$/KWH
 Gas Rate: 10.51 \$/MWH Demand Rate: \$/KW

ECO Number	Annual Water Saving LPY	Annual Energy Saving			WATER	Total	Total
ECO Type		ELEC KW	ELEC KWH	GAS MWH	Dollar Saving	Dollar Saving	Dollars Invested
1 Lavatory Sinks	279,630			1	\$116.05	\$122.76	\$1,468.80
ECO1 TOTAL:	279,630	0	0	1	\$116.05	\$122.76	\$1,468.80
2 Misc. Sinks	0			0	\$0.00	\$0.00	\$0.00
ECO2 TOTAL:	0	0	0	0	\$0.00	\$0.00	\$0.00
3 Water Closets	29,640				\$12.30	\$12.30	\$360.29
ECO3 TOTAL:	29,640				\$12.30	\$12.30	\$360.29
4 Urinals	4,914				\$2.04	\$2.04	\$127.30
ECO4 TOTAL:	4,914				\$2.04	\$2.04	\$127.30
5 Shower Heads	0			0	\$0.00	\$0.00	\$0.00
ECO5 TOTAL:	0	0	0	0	\$0.00	\$0.00	\$0.00
6 Equipment Related							
ECO6 TOTAL:	0	0	0	0	\$0.00	\$0.00	\$0.00

SYSTEMS CORP

Systems Engineering and Management Corporation, Knoxville, TN

FY94S EEAP FT. KNOX WATER CONSERVATION STUDY

1002

CALCULATION WORK SHEET 1

DATE: 31 Oct 94

FACILITY NO.: 6629

FUNCTION:

Admin Facility

Occupancy: 40

Operating Hours:

12

ECO Number ECO Type	Existing Fixture System		Retrofited Fixture System		Usage HRS/YR	Fixtures Quantity	Water Leaks Eliminated LPY
	Description	LPM	Description	LPM			
1	Public Lavatory	9.5	Spring Loaded Faucets	4.7	130	3	
Lavatory Sinks							
ECO1 TOTAL:		LPM		LPM		3	0
2							
Misc. Sinks							
ECO2 TOTAL:		LPF		LPF	#FL/YR	0	0
3	Floor Mounted Flush Valve	17	Install 3.5 GPF Flush Valve	13.2	10400	3	
Water Closets							
			Repair Kit				
ECO3 TOTAL:		LPF		LPF	#FL/YR	3	0
4							
Urinals							
ECO4 TOTAL:		LPM		LPM	HRS/YR	0	0
5							
Shower Heads							
ECO5 TOTAL:		LPM		LPM		0	0
6							
Equipment Related							
ECO6 TOTAL:						0	0

CALCULATION WORK SHEET 2

FACILITY NO.: 6629 Water Rate: 0.42 \$/KL Energy Rate: \$/KWH

Gas Rate: 10.51 \$/MWH Demand Rate: \$/KW

ECO Number	Annual Water Saving	LPY	Annual Energy Saving			WATER		Total	Total
ECO Type			ELEC KW	ELEC KWH	GAS MWH	Dollar Saving	Dollar Saving	Dollar Saving	Dollars Invested
1	139,815				0	\$58.02	\$61.38	\$734.40	
Lavatory Sinks	0				0	\$0.00	\$0.00	\$0.00	
ECO1 TOTAL:	139,815		0	0	0	\$58.02	\$61.38	\$734.40	
2	0				0	\$0.00	\$0.00	\$0.00	
Misc. Sinks									
ECO2 TOTAL:	0		0	0	0	\$0.00	\$0.00	\$0.00	
3	118,560					\$49.20	\$49.20	\$190.94	
Water Closets									
ECO3 TOTAL:	118,560					\$49.20	\$49.20	\$190.94	
4	0					\$0.00	\$0.00	\$0.00	
Urinals									
ECO4 TOTAL:	0					\$0.00	\$0.00	\$0.00	
5	0				0	\$0.00	\$0.00	\$0.00	
Shower Heads									
ECO5 TOTAL:	0		0	0	0	\$0.00	\$0.00	\$0.00	
6									
Equipment Related									
ECO6 TOTAL:	0		0	0	0	\$0.00	\$0.00	\$0.00	

SYSTEMS CORP

Systems Engineering and Management Corporation, Knoxville, TN

FY94S EEAP FT. KNOX WATER CONSERVATION STUDY										1002	
CALCULATION WORK SHEET 1										DATE: 31 Oct 94	
FACILITY NO. : 6631		FUNCTION: Officers Quarters									
Occupancy: 16		Operating Hours: 24									
ECO Number	ECO Type	Existing Fixture System	Retrofitted Fixture System	Usage	Fixtures	Water Leaks					
		Description	Description	HRS/YR	Quantity	Eliminated LPY					
1	Lavatory Sinks	Private Lavatory	Spring Loaded Faucets	11	4.7	130	16				
ECO1 TOTAL:											
2	Misc. Sinks										
ECO2 TOTAL:											
3	Water Closets	Floor Mounted Flush Valve	Install 3.5 GPF Flush Valve	17	13.2	1825	16				
ECO3 TOTAL:											
4	Urinals										
ECO4 TOTAL:											
5	Shower Heads										
ECO5 TOTAL:											
6	Equipment Related										
ECO6 TOTAL:											

SYSTEMS CORP

Systems Engineering and Management Corporation, Knoxville, TN

FY94S EEAP FT. KNOX WATER CONSERVATION STUDY 2 OF 2

CALCULATION WORK SHEET 2

FACILITY NO.: 6631 Water Rate: 0.42 \$/KL Energy Rate: \$/KWH

Gas Rate: 10.51 \$/MWH Demand Rate: \$/KW

ECO Number	Annual Water Saving LPY	Annual Energy Saving			WATER		Total	Total
ECO Type		ELEC KW	ELEC KWH	GAS MWH	Dollar Saving	Dollar Saving	Dollar Saving	Dollars Invested
1				2	\$387.15	\$409.56	\$3,916.80	
Lavatory Sinks	932,880			0	\$0.00	\$0.00	\$0.00	\$0.00
ECO1 TOTAL:	932,880	0	0	2	\$387.15	\$409.56	\$3,916.80	
2				0	\$0.00	\$0.00	\$0.00	
Misc. Sinks	0							
ECO2 TOTAL:	0	0	0	0	\$0.00	\$0.00	\$0.00	\$0.00
3					\$46.05	\$46.05	\$960.77	
Water Closets	110,960							
ECO3 TOTAL:	110,960				\$46.05	\$46.05	\$960.77	
4					\$0.00	\$0.00	\$0.00	
Urinals	0							
ECO4 TOTAL:	0				\$0.00	\$0.00	\$0.00	\$0.00
5				0	\$0.00	\$0.00	\$0.00	
Shower Heads	0							
ECO5 TOTAL:	0	0	0	0	\$0.00	\$0.00	\$0.00	\$0.00
6								
Equipment Related								
ECO6 TOTAL:	0	0	0	0	\$0.00	\$0.00	\$0.00	\$0.00

SYSTEMS CORP

Systems Engineering and Management Corporation, Knoxville, TN

FY94S EEAP FT. KNOX WATER CONSERVATION STUDY										1 of 2
CALCULATION WORK SHEET 1										DATE: 31 Oct 94
FACILITY NO. : 6670		FUNCTION: Enlisted Barracks								
Occupancy: 12		Operating Hours: 15								
ECO Number	ECO Type	Existing Fixture System		Retrofited Fixture System		Usage	Fixtures	Water Leaks		
		Description	LPM	Description	LPM	HRS/YR	Quantity	Eliminated LPY		
1	Lavatory Sinks	Public Lavatory	9.5	Spring Loaded Faucets	4.7	730	6			
ECO1 TOTAL:			LPM		LPM		6	0		
2	Misc. Sinks	Service Sink	23	Install Aerators	9.5	2080	1			
ECO2 TOTAL:			LPM		LPM					
3	Water Closets	Floor Mounted Flush Valve	17	Install 3.5 GPF Flush Valve	13.2	2000	5			
ECO3 TOTAL:			LPM		LPM		5	0		
4	Urinals	Wall Mounted Flush Valve	5.68	Install 1.0 GPF Flush Valve	3.79	6000	3			
ECO4 TOTAL:			LPM		LPM		3	0		
5	Shower Heads									
ECO5 TOTAL:			LPM		LPM		0	0		
6	Equipment Related									
ECO6 TOTAL:							0	0		

SYSTEMS CORP

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CALCULATION WORK SHEET 2

FACILITY NO.: 6670
 Water Rate: 0.42 \$/KL Energy Rate: \$/KWH
 Gas Rate: 10.51 \$/MWH Demand Rate: \$/KW

ECO Number	Annual Water Saving LPY	Annual Energy Saving			WATER		Total	Total
ECO Type		ELEC KW	ELEC KWH	GAS MWH	Dollar Saving	Dollar Saving	Dollars Invested	
1 Lavatory Sinks	1,570,230 0			4 0	\$651.65 \$0.00	\$689.37 \$0.00	\$1,468.80 \$0.00	
ECO1 TOTAL:	1,570,230	0	0	4	\$651.65	\$689.37	\$1,468.80	
2 Misc. Sinks	1,684,800			4	\$6.99	\$47.47	\$9.70	
ECO2 TOTAL:	1,684,800	0	0	4	\$6.99	\$47.47	\$9.70	
3 Water Closets	38,000				\$15.77	\$15.77	\$300.24	
ECO3 TOTAL:	38,000				\$15.77	\$15.77	\$300.24	
4 Urinals	34,020				\$14.12	\$14.12	\$190.94	
ECO4 TOTAL:	34,020				\$14.12	\$14.12	\$190.94	
5 Shower Heads	0			0	\$0.00	\$0.00	\$0.00	
ECO5 TOTAL:	0	0	0	0	\$0.00	\$0.00	\$0.00	
6 Equipment Related								
ECO6 TOTAL:	0	0	0	0	\$0.00	\$0.00	\$0.00	

SYSTEMS CORP

Systems Engineering and Management Corporation, Knoxville, TN

CALCULATION WORK SHEET 2

FACILITY NO.: 6758
 Water Rate: 0.42 \$/KL Energy Rate: \$/KWH
 Gas Rate: 10.51 \$/MWH Demand Rate: \$/KW

ECO Number	ECO Type	Annual Water Saving LPY	Annual Energy Saving			WATER	Total	
			ELEC KW	ELEC KWH	GAS MWH		Dollar Saving	Dollars Invested
1	Lavatory Sinks	466,050			1	\$193.41	\$204.61	\$2,448.00
		0			0	\$0.00	\$0.00	\$0.00
ECO1 TOTAL:		466,050	0	0	1	\$193.41	\$204.61	\$2,448.00
2	Misc. Sinks				0	\$0.00	\$0.00	\$0.00
ECO2 TOTAL:		0	0	0	0	\$0.00	\$0.00	\$0.00
3	Water Closets	34,580				\$14.35	\$14.35	\$420.34
ECO3 TOTAL:		34,580				\$14.35	\$14.35	\$420.34
4	Urinals	9,828				\$4.08	\$4.08	\$254.59
ECO4 TOTAL:		9,828				\$4.08	\$4.08	\$254.59
5	Shower Heads	0			0	\$0.00	\$0.00	\$0.00
ECO5 TOTAL:		0	0	0	0	\$0.00	\$0.00	\$0.00
6	Equipment Related							
ECO6 TOTAL:		0	0	0	0	\$0.00	\$0.00	\$0.00

SYSTEMS CORP

Systems Engineering and Management Corporation, Knoxville, TN

FY94S EEAP FT. KNOX WATER CONSERVATION STUDY

10

CALCULATION WORK SHEET 1

DATE: 31 Oct 94

FACILITY NO.:

6837

FUNCTION:

Clinic

Occupancy:

10

Operating Hours:

8

ECO Number	ECO Type	Existing Fixture System	Retrofited Fixture System	Usage	Fixtures	Water Leaks
		Description	Description	HRS/YR	Quantity	Eliminated LPY
1	Lavatory Sinks	Public Lavatory	Spring Loaded Faucets	130	10	
ECO1 TOTAL:					10	0
2	Misc. Sinks	Service Sink	Install Aerators	130	3	
ECO2 TOTAL:						
3	Water Closets	Floor Mounted Flush Valve	Install 3.5 GPF Flush Valve	2200	6	
			Repair Kit			
ECO3 TOTAL:					6	0
4	Urinals	Wall Mounted Flush Valve	Install 1.0 GPF Flush Valve	7800	1	
			Repair Kit			
ECO4 TOTAL:					1	0
5	Shower Heads					
ECO5 TOTAL:					0	0
6	Equipment Related					
ECO6 TOTAL:					0	0

CALCULATION WORK SHEET 2

FACILITY NO.: 6837 Water Rate: 0.42 \$/KL Energy Rate: \$/KWH

Gas Rate: 10.51 \$/MWH Demand Rate: \$/KW

ECO Number	ECO Type	Annual Water		Annual Energy Saving			WATER		Total	
		Saving	LPY	ELEC KW	ELEC KWH	GAS MWH	Dollar Saving		Dollar Saving	Dollars Invested
1	Lavatory Sinks	466,050				1	\$193.41		\$204.61	\$2,448.00
		0				0	\$0.00		\$0.00	\$0.00
ECO1 TOTAL:		466,050		0	0	1	\$193.41		\$204.61	\$2,448.00
2	Misc. Sinks	222,300				1	\$0.92		\$0.98	\$29.09
ECO2 TOTAL:		222,300		0	0	1	\$0.92		\$0.98	\$29.09
3	Water Closets	50,160					\$20.82		\$20.82	\$360.29
ECO3 TOTAL:		50,160					\$20.82		\$20.82	\$360.29
4	Urinals	14,742					\$6.12		\$6.12	\$63.65
ECO4 TOTAL:		14,742					\$6.12		\$6.12	\$63.65
5	Shower Heads	0				0	\$0.00		\$0.00	\$0.00
ECO5 TOTAL:		0		0	0	0	\$0.00		\$0.00	\$0.00
6	Equipment Related									
ECO6 TOTAL:		0		0	0	0	\$0.00		\$0.00	\$0.00

SYSTEMS CORP

Systems Engineering and Management Corporation, Knoxville, TN

FY94S EEAP FT. KNOX WATER CONSERVATION STUDY										10
CALCULATION WORK SHEET 1										DATE: 31 Oct 94
FACILITY NO. : 6863		FUNCTION: Enlisted Barracks								
Occupancy: Operating Hours:										
ECO Number ECO Type	Existing Fixture System		Retrofitted Fixture System		Usage HRS/YR	Fixtures Quantity	Water Leaks Eliminated LPY			
	Description	LPM	Description	LPM						
1 Lavatory Sinks	Public Lavatory	9.5	Spring Loaded Faucets	4.7	130	4				
ECO1 TOTAL:										
2 Misc. Sinks										
ECO2 TOTAL:										
3 Water Closets										
ECO3 TOTAL:										
4 Urinals										
ECO4 TOTAL:										
5 Shower Heads										
ECO5 TOTAL:										
6 Equipment Related										
ECO6 TOTAL:										

SYSTEMS CORP

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CALCULATION WORK SHEET 2

FACILITY NO.: 6863
 Water Rate: 0.42 \$/KL Energy Rate: \$/KWH
 Gas Rate: 10.51 \$/MWH Demand Rate: \$/KW

ECO Number	ECO Type	Annual Water		Annual Energy Saving			WATER		Total	
		Saving	LPY	ELEC KW	ELEC KWH	GAS MWH	Dollar Saving		Dollar Saving	Dollars Invested
1	Lavatory Sinks	186,420				0	\$77.36		\$81.84	\$979.20
		0				0	\$0.00		\$0.00	\$0.00
ECO1 TOTAL:		186,420		0	0	0	\$77.36		\$81.84	\$979.20
2	Misc. Sinks	0				0	\$0.00		\$0.00	\$0.00
ECO2 TOTAL:		0		0	0	0	\$0.00		\$0.00	\$0.00
3	Water Closets	0					\$0.00		\$0.00	\$0.00
ECO3 TOTAL:		0					\$0.00		\$0.00	\$0.00
4	Urinals	0					\$0.00		\$0.00	\$0.00
ECO4 TOTAL:		0					\$0.00		\$0.00	\$0.00
5	Shower Heads	0				0	\$0.00		\$0.00	\$0.00
ECO5 TOTAL:		0		0	0	0	\$0.00		\$0.00	\$0.00
6	Equipment Related									
ECO6 TOTAL:		0		0	0	0	\$0.00		\$0.00	\$0.00

SYSTEMS CORP

Systems Engineering and Management Corporation, Knoxville, TN

FY94S EEAP FT. KNOX WATER CONSERVATION STUDY

1 Oct 94

DATE: 31 Oct 94

CALCULATION WORK SHEET 1

Storage

FUNCTION:

6894

FACILITY NO.:

Operating Hours:

Occupancy:

ECO Number ECO Type	Existing Fixture System		Retrofited Fixture System		Usage HRS/YR	Fixtures Quantity	Water Leaks Eliminated LPY
	Description	LPM	Description	LPM			
1	Private Lavatory	17	Spring Loaded Faucets (NO MIXING VALVE)	4.7	20	2	
Lavatory Sinks							
ECO1 TOTAL:		LPM		LPM		2	0
2							
Misc. Sinks							
ECO2 TOTAL:							
3	Floor Mounted Flush Valve	17	Install 3.5 GPF Flush Valve	13.2	20	2	
Water Closets							
			Repair Kit				
	Tank Type (private)	11.4	Install 1.6 GPF Tank Type	6	20	1	
ECO3 TOTAL:		LPF		LPF	#FL/YR	3	0
4							
Urinals							
ECO4 TOTAL:							
5		LPM		LPM	HRS/YR	0	0
Shower Heads							
ECO5 TOTAL:		LPM		LPM		0	0
6							
Equipment Related							
ECO6 TOTAL:						0	0

CALCULATION WORK SHEET 2

FACILITY NO.: 6894 Water Rate: 0.42 \$/KL Energy Rate: \$/KWH

Gas Rate: 10.51 \$/MWH Demand Rate: \$/KW

ECO Number	ECO Type	Annual Water		Annual Energy Saving			WATER		Total	
		Saving	LPY	ELEC KW	ELEC KWH	GAS MWH	Dollar Saving		Dollar Saving	Dollars Invested
1	Lavatory Sinks	32,340				0	\$13.42		\$14.20	\$489.60
		0				0	\$0.00		\$0.00	\$0.00
ECO1 TOTAL:		32,340		0	0	0	\$13.42		\$14.20	\$489.60
2	Misc. Sinks					0	\$0.00		\$0.00	\$0.00
ECO2 TOTAL:		0		0	0	0	\$0.00		\$0.00	\$0.00
3	Water Closets	152					\$0.06		\$0.06	\$120.10
		108					\$0.04		\$0.04	\$419.16
ECO3 TOTAL:		260					\$0.11		\$0.11	\$539.26
4	Urinals	0					\$0.00		\$0.00	\$0.00
ECO4 TOTAL:		0					\$0.00		\$0.00	\$0.00
5	Shower Heads	0				0	\$0.00		\$0.00	\$0.00
ECO5 TOTAL:		0		0	0	0	\$0.00		\$0.00	\$0.00
6	Equipment Related									
ECO6 TOTAL:		0		0	0	0	\$0.00		\$0.00	\$0.00

SYSTEMS CORP

Systems Engineering and Management Corporation, Knoxville, TN

FY94S EEAP FT. KNOX WATER CONSERVATION STUDY

10

DATE: 29 Oct 94

CALCULATION WORK SHEET 1

FUNCTION: Maintenance

6897

FACILITY NO.:

Operating Hours: 8

4

Occupancy:

ECO Number ECO Type	Existing Fixture System		Retrofited Fixture System		Usage HRS/YR	Fixtures Quantity	Water Leaks Eliminated LPY
	Description	LPM	Description	LPM			
1	Public Lavatory	26.5	Spring Loaded Faucets	4.7	730	1	
Lavatory Sinks							
ECO1 TOTAL:		LPM		LPM		1	0
2							
Misc. Sinks							
ECO2 TOTAL:		LPM		LPM		0	0
3	Floor Mounted Flush Valve	17	Install 3.5 GPF Flush Valve	13.2	18250	1	
Water Closets			Repair Kit				
ECO3 TOTAL:		LPM		LPM		1	0
4							
Urinals							
ECO4 TOTAL:		LPM		LPM		0	0
5							
Shower Heads							
ECO5 TOTAL:		LPM		LPM		0	0
6							
Equipment							
Related							
ECO6 TOTAL:						0	0

SYSTEMS CORP

Systems Engineering and Management Corporation, Knoxville, TN

CALCULATION WORK SHEET 2

FACILITY NO.: 6897 Water Rate: 0.42 \$/KL Energy Rate: \$/KWH
 Gas Rate: 10.51 \$/MWH Demand Rate: \$/KW

ECO Number	Annual Water Saving LPY	Annual Energy Saving			WATER	Total	Total
ECO Type		ELEC KW	ELEC KWH	GAS MWH	Dollar Saving	Dollar Saving	Dollars Invested
1							
Lavatory Sinks	1,006,305			3	\$417.62	\$444.21	\$244.80
	0			0	\$0.00	\$0.00	\$0.00
	0			0	\$0.00	\$0.00	\$0.00
ECO1 TOTAL:	1,006,305	0	0	3	\$417.62	\$444.21	\$244.80
2							
Misc. Sinks	0			0	\$0.00	\$0.00	\$0.00
	0			0	\$0.00	\$0.00	\$0.00
	0			0	\$0.00	\$0.00	\$0.00
ECO2 TOTAL:	0	0	0	0	\$0.00	\$0.00	\$0.00
3							
Water Closets	69,350				\$28.78	\$28.78	\$60.05
	0				\$0.00	\$0.00	\$0.00
	0				\$0.00	\$0.00	\$0.00
ECO3 TOTAL:	69,350				\$28.78	\$28.78	\$60.05
4							
Urinals	0				\$0.00	\$0.00	\$106.08
	0				\$0.00	\$0.00	\$0.00
	0				\$0.00	\$0.00	\$0.00
ECO4 TOTAL:	0				\$0.00	\$0.00	\$106.08
5							
Shower Heads	0			0	\$0.00	\$0.00	\$0.00
	0			0	\$0.00	\$0.00	\$0.00
	0			0	\$0.00	\$0.00	\$0.00
ECO5 TOTAL:	0	0	0	0	\$0.00	\$0.00	\$0.00
6							
Equipment Related	0			0	\$0.00	\$0.00	\$0.00
	0			0	\$0.00	\$0.00	\$0.00
	0			0	\$0.00	\$0.00	\$0.00
	0			0	\$0.00	\$0.00	\$0.00
ECO6 TOTAL:	0	0	0	0	\$0.00	\$0.00	\$0.00

SYSTEMS CORP

Systems Engineering and Management Corporation, Knoxville, TN

FY94S EEAP FT. KNOX WATER CONSERVATION STUDY

1 Oct 94

DATE: 31 Oct 94

CALCULATION WORK SHEET 1

Enlisted Barracks

FUNCTION:

7029

FACILITY NO.:

Operating Hours: 15

12

Occupancy:

ECO Number ECO Type	Existing Fixture System		Retrofited Fixture System		Usage HRS/YR	Fixtures Quantity	Water Leaks Eliminated LPY
	Description	LPM	Description	LPM			
1	Public Lavatory	9.5	Spring Loaded Faucets	4.7	730	4	
Lavatory Sinks							
ECO1 TOTAL:		LPM		LPM		4	0
2	Service Sink	23	Install Aerators	9.5	2080	1	
Misc. Sinks							
ECO2 TOTAL:		LPM		LPM		1	0
3	Floor Mounted Flush Valve	17	Install 3.5 GPF Flush Valve	13.2	2200	4	
Water Closets							
ECO3 TOTAL:		LPM		LPM		4	0
4	Wall Mounted Flush Valve	5.68	Install 1.0 GPF Flush Valve	3.79	8700	2	
Urinals							
ECO4 TOTAL:		LPM		LPM		2	0
5	Shower Heads						
ECO5 TOTAL:		LPM		LPM		0	0
6	Equipment Related						
ECO6 TOTAL:						0	0

SYSTEMS CORP

Systems Engineering and Management Corporation, Knoxville, TN

CALCULATION WORK SHEET 2

FACILITY NO. : 7029 Water Rate: 0.42 \$/KL Energy Rate: \$/KWH

Gas Rate: 10.51 \$/MWH Demand Rate: \$/KW

ECO Number	Annual Water Saving LPY	Annual Energy Saving			WATER	Total	Total
ECO Type		ELEC KW	ELEC KWH	GAS MWH	Dollar Saving	Dollar Saving	Dollars Invested
1							
Lavatory Sinks	1,046,820			2	\$434.43	\$459.58	\$979.20
	0			0	\$0.00	\$0.00	\$0.00
ECO1 TOTAL:	1,046,820	0	0	2	\$434.43	\$459.58	\$979.20
2							
Misc. Sinks	1,684,800			4	\$6.99	\$47.47	\$9.70
ECO2 TOTAL:	1,684,800	0	0	4	\$6.99	\$47.47	\$9.70
3							
Water Closets	33,440				\$13.88	\$13.88	\$240.19
ECO3 TOTAL:	33,440				\$13.88	\$13.88	\$240.19
4							
Urinals	32,886				\$13.65	\$13.65	\$127.30
ECO4 TOTAL:	32,886				\$13.65	\$13.65	\$127.30
5							
Shower Heads	0			0	\$0.00	\$0.00	\$0.00
ECO5 TOTAL:	0	0	0	0	\$0.00	\$0.00	\$0.00
6							
Equipment Related							
ECO6 TOTAL:	0	0	0	0	\$0.00	\$0.00	\$0.00

SYSTEMS CORP

Systems Engineering and Management Corporation, Knoxville, TN

FY94S EEAP FT. KNOX WATER CONSERVATION STUDY

1 Oct 94

CALCULATION WORK SHEET 1

DATE: 31 Oct 94

FACILITY NO.: 7031

FUNCTION: Training Building

Occupancy: 2

Operating Hours: 9

ECO Number ECO Type	Existing Fixture System		Retrofited Fixture System		Usage HRS/YR	Fixtures Quantity	Water Leaks Eliminated LPY
	Description	LPM	Description	LPM			
1	Public Lavatory	9.5	Spring Loaded Faucets	4.7	130	3	
Lavatory Sinks							
ECO1 TOTAL:		LPM		LPM		3	0
2							
Misc. Sinks							
ECO2 TOTAL:							
3	Floor Mounted Flush Valve	17	Install 3.5 GPF Flush Valve	13.2	1300	3	0
Water Closets							
			Repair Kit				
ECO3 TOTAL:		LPF		LPF	#FL/YR	0	0
4	Wall Mounted Flush Valve	5.68	Install 1.0 GPF Flush Valve	3.79	1300	1	
Urinals							
			Repair Kit				
ECO4 TOTAL:		LPF		LPF	HRS/YR	1	0
5							
Shower Heads							
ECO5 TOTAL:		LPM		LPM		0	0
6							
Equipment Related							
ECO6 TOTAL:						0	0

SYSTEMS CORP

Systems Engineering and Management Corporation, Knoxville, TN

CALCULATION WORK SHEET 2

FACILITY NO.: 7031
 Water Rate: 0.42 \$/KL Energy Rate: \$/KWH
 Gas Rate: 10.51 \$/MWH Demand Rate: \$/KW

ECO Number	ECO Type	Annual Water		Annual Energy Saving			WATER		Total	
		Saving	LPY	ELEC KW	ELEC KWH	GAS MWH	Dollar Saving	Dollar Saving	Dollar Saving	Dollars Invested
1	Lavatory Sinks	139,815				0	\$58.02	\$61.38	\$734.40	
		0				0	\$0.00	\$0.00	\$0.00	
ECO1 TOTAL:		139,815		0	0	0	\$58.02	\$61.38	\$734.40	
2	Misc. Sinks	0				0	\$0.00	\$0.00	\$0.00	
ECO2 TOTAL:		0		0	0	0	\$0.00	\$0.00	\$0.00	
3	Water Closets	14,820					\$6.15	\$6.15	\$180.14	
ECO3 TOTAL:		14,820					\$6.15	\$6.15	\$180.14	
4	Urinals	2,457					\$1.02	\$1.02	\$63.65	
ECO4 TOTAL:		2,457					\$1.02	\$1.02	\$63.65	
5	Shower Heads	0				0	\$0.00	\$0.00	\$0.00	
ECO5 TOTAL:		0		0	0	0	\$0.00	\$0.00	\$0.00	
6	Equipment Related									
ECO6 TOTAL:		0		0	0	0	\$0.00	\$0.00	\$0.00	

SYSTEMS CORP

Systems Engineering and Management Corporation, Knoxville, TN

FY94S EEAP FT. KNOX WATER CONSERVATION STUDY										10
CALCULATION WORK SHEET 1										DATE: 31 Oct 94
FACILITY NO. : 7041		FUNCTION: Training Building								
Occupancy: 50		Operating Hours: 16								
ECO Number	ECO Type	Existing Fixture System	Retrofited Fixture System		Usage	Fixtures	Water Leaks			
		Description	LPM	Description	HRS/YR	Quantity	Eliminated LPY			
1	Lavatory Sinks	Public Lavatory	17	Spring Loaded Faucets	130	3				
ECO1 TOTAL:			LPM			3	0			
2	Misc. Sinks									
ECO2 TOTAL:										
3	Water Closets	Floor Mounted Flush Valve	17	Install 3.5 GPF Flush Valve	3000	3	0			
				Repair Kit						
ECO3 TOTAL :			LPM			3	0			
4	Urinals	Wall Mounted Flush Valve	5.68	Install 1.0 GPF Flush Valve	13000	1				
				Repair Kit						
ECO4 TOTAL :			LPM			1	0			
5	Shower Heads									
ECO5 TOTAL :			LPM			0	0			
6	Equipment Related									
ECO6 TOTAL :						0	0			

CALCULATION WORK SHEET 2

FACILITY NO.: 7041
 Water Rate: 0.42 \$/KL Energy Rate: \$/KWH
 Gas Rate: 10.51 \$/MWH Demand Rate: \$/KW

ECO Number	Annual Water Saving LPY	Annual Energy Saving			WATER		Total	Total
ECO Type		ELEC KW	ELEC KWH	GAS MWH	Dollar Saving	Dollar Saving	Dollar Saving	Dollars Invested
1 Lavatory Sinks	315,315 0			1 0	\$130.86 \$0.00	\$138.43 \$0.00	\$734.40 \$0.00	
ECO1 TOTAL:	315,315	0	0	1	\$130.86	\$138.43	\$734.40	
2 Misc. Sinks	0			0	\$0.00	\$0.00	\$0.00	
ECO2 TOTAL:	0	0	0	0	\$0.00	\$0.00	\$0.00	
3 Water Closets	34,200				\$14.19	\$14.19	\$180.14	
ECO3 TOTAL:	34,200				\$14.19	\$14.19	\$180.14	
4 Urinals	24,570				\$10.20	\$10.20	\$63.65	
ECO4 TOTAL:	24,570				\$10.20	\$10.20	\$63.65	
5 Shower Heads	0			0	\$0.00	\$0.00	\$0.00	
ECO5 TOTAL:	0	0	0	0	\$0.00	\$0.00	\$0.00	
6 Equipment Related								
ECO6 TOTAL:	0	0	0	0	\$0.00	\$0.00	\$0.00	

SYSTEMS CORP

Systems Engineering and Management Corporation, Knoxville, TN

FY94S EEAP FT. KNOX WAT. CONSERVATION STUDY										10
CALCULATION WORK SHEET 1										DATE: 31 Oct 94
FACILITY NO.:		7104		FUNCTION:		Admin Facility				
Occupancy:		3		Operating Hours:		11				
ECO Number	ECO Type	Existing Fixture System	Description	Retrofitted Fixture System	Usage	Fixtures	Water Leaks			
					HRS/YR	Quantity	Eliminated LPY			
1	Lavatory Sinks	Public Lavatory		Spring Loaded Faucets	4.7	130	3	15800		
ECO1 TOTAL:										
2	Misc. Sinks	Service Sink		Install Aerators	9.5	130	1			
ECO2 TOTAL:										
3	Water Closets	Floor Mounted Flush Valve		Install 3.5 GPF Flush Valve	13.2	1300	3			
ECO3 TOTAL:										
4	Urinals	Wall Mounted Flush Valve		Install 1.0 GPF Flush Valve	3.79	1300	4			
ECO4 TOTAL:										
5	Shower Heads									
ECO5 TOTAL:										
6	Equipment Related									
ECO6 TOTAL:										

CALCULATION WORK SHEET 2

FACILITY NO.: 7104 Water Rate: 0.42 \$/KL Energy Rate: \$/KWH

Gas Rate: 10.51 \$/MWH Demand Rate: \$/KW

ECO Number	Annual Water Saving LPY	Annual Energy Saving			WATER	Total	Total
ECO Type		ELEC KW	ELEC KWH	GAS MWH	Dollar Saving	Dollar Saving	Dollars Invested
1	331,115			1	\$137.41	\$145.37	\$734.40
Lavatory Sinks	0			0	\$0.00	\$0.00	\$0.00
ECO1 TOTAL:	331,115	0	0	1	\$137.41	\$145.37	\$734.40
2	105,300			0	\$0.44	\$0.46	\$9.70
Misc. Sinks							
ECO2 TOTAL:	105,300	0	0	0	\$0.44	\$0.46	\$9.70
3	14,820				\$6.15	\$6.15	\$180.14
Water Closets							
ECO3 TOTAL:	14,820				\$6.15	\$6.15	\$180.14
4	9,828				\$4.08	\$4.08	\$254.59
Urinals							
ECO4 TOTAL:	9,828				\$4.08	\$4.08	\$254.59
5	0			0	\$0.00	\$0.00	\$0.00
Shower Heads							
ECO5 TOTAL:	0	0	0	0	\$0.00	\$0.00	\$0.00
6							
Equipment Related							
ECO6 TOTAL:	0	0	0	0	\$0.00	\$0.00	\$0.00

SYSTEMS CORP

Systems Engineering and Management Corporation, Knoxville, TN

FY94S EEAP FT. KNOX WATER CONSERVATION STUDY

10

DATE: 31 Oct 94

CALCULATION WORK SHEET 1

FACILITY NO.: 7392

FUNCTION: Enlisted Barracks

Occupancy: 43

Operating Hours: 15

ECO Number ECO Type	Existing Fixture System		Retrofited Fixture System		Usage HRS/YR	Fixtures Quantity	Water Leaks Eliminated LPY
	Description	LPM	Description	LPM			
1	Public Lavatory	17	Spring Loaded Faucets	4.7	730	6	
Lavatory Sinks							
ECO1 TOTAL:		LPM		LPM		6	0
2							
Misc. Sinks							
ECO2 TOTAL:		LPF		LPF	#FL/YR	0	0
3	Floor Mounted Flush Valve	17	Install 3.5 GPF Flush Valve	13.2	8000	4	
Water Closets							
			Repair Kit				
ECO3 TOTAL:		LPF		LPF	#FL/YR	4	0
4	Wall Mounted Flush Valve	5.68	Install 1.0 GPF Flush Valve	3.79	23000	3	
Urinals							
			Repair Kit				
ECO4 TOTAL:		LPM		LPM	HRS/YR	3	0
5							
Shower Heads							
ECO5 TOTAL:		LPM		LPM		0	0
6							
Equipment Related							
ECO6 TOTAL:						0	0

SYSTEMS CORP

Systems Engineering and Management Corporation, Knoxville, TN

CALCULATION WORK SHEET 2

FACILITY NO.: 7392 Water Rate: 0.42 \$/KL Energy Rate: \$/KWH

Gas Rate: 10.51 \$/MWH Demand Rate: \$/KW

ECO Number	Annual Water Saving LPY	Annual Energy Saving			WATER	Total	Total
ECO Type		ELEC KW	ELEC KWH	GAS MWH	Dollar Saving	Dollar Saving	Dollars Invested
1	3,541,230			8	\$1,469.61	\$1,554.68	\$1,468.80
Lavatory Sinks	0			0	\$0.00	\$0.00	\$0.00
ECO1 TOTAL:	3,541,230	0	0	8	\$1,469.61	\$1,554.68	\$1,468.80
2	0			0	\$0.00	\$0.00	\$0.00
Misc. Sinks							
ECO2 TOTAL:	0	0	0	0	\$0.00	\$0.00	\$0.00
3	121,600				\$50.46	\$50.46	\$240.19
Water Closets							
ECO3 TOTAL:	121,600				\$50.46	\$50.46	\$240.19
4	130,410				\$54.12	\$54.12	\$190.94
Urinals							
ECO4 TOTAL:	130,410				\$54.12	\$54.12	\$190.94
5	0			0	\$0.00	\$0.00	\$0.00
Shower Heads							
ECO5 TOTAL:	0	0	0	0	\$0.00	\$0.00	\$0.00
6							
Equipment Related							
ECO6 TOTAL:	0	0	0	0	\$0.00	\$0.00	\$0.00

SYSTEMS CORP

Systems Engineering and Management Corporation, Knoxville, TN

FY94S EEAP FT. KNOX WATER CONSERVATION STUDY

1002

DATE: 31 Oct 94

Enlisted Barracks

FUNCTION:

7393

FACILITY NO.:

Operating Hours: 15

43

Occupancy:

ECO Number ECO Type	Existing Fixture System		Retrofited Fixture System		Usage HRS/YR	Fixtures Quantity	Water Leaks Eliminated LPY
	Description	LPM	Description	LPM			
1 Lavatory Sinks	Public Lavatory	17	Spring Loaded Faucets	4.7	730	6	
ECO1 TOTAL:		LPM		LPM		6	0
2 Misc. Sinks							
ECO2 TOTAL:		LPM		LPM			
3 Water Closets	Floor Mounted Flush Valve	17	Install 3.5 GPF Flush Valve	13.2	8000	4	0
			Repair Kit				
ECO3 TOTAL:		LPM		LPM		4	0
4 Urinals	Wall Mounted Flush Valve	5.68	Install 1.0 GPF Flush Valve	3.79	23000	3	
			Repair Kit				
ECO4 TOTAL:		LPM		LPM		3	0
5 Shower Heads							
ECO5 TOTAL:		LPM		LPM		0	0
6 Equipment Related							
ECO6 TOTAL:						0	0

SYSTEMS CORP

Systems Engineering and Management Corporation, Knoxville, TN

CALCULATION WORK SHEET 2

FACILITY NO.: 7393
 Water Rate: 0.42 \$/KL Energy Rate: \$/KWH
 Gas Rate: 10.51 \$/MWH Demand Rate: \$/KW

ECO Number	Annual Water Saving	LPY	Annual Energy Saving			WATER		Total	Total
ECO Type			ELEC KW	ELEC KWH	GAS MWH	Dollar Saving	Dollar Saving	Dollar Saving	Dollars Invested
1 Lavatory Sinks	3,541,230	0			8	\$1,469.61	\$1,554.68	\$1,468.80	\$0.00
ECO1 TOTAL:	3,541,230	0	0	0	8	\$1,469.61	\$1,554.68	\$1,468.80	\$0.00
2 Misc. Sinks					0	\$0.00	\$0.00	\$0.00	\$0.00
ECO2 TOTAL:	0	0	0	0	0	\$0.00	\$0.00	\$0.00	\$0.00
3 Water Closets	121,600					\$50.46	\$50.46	\$240.19	
ECO3 TOTAL:	121,600					\$50.46	\$50.46	\$240.19	
4 Urinals	130,410					\$54.12	\$54.12	\$190.94	
ECO4 TOTAL:	130,410					\$54.12	\$54.12	\$190.94	
5 Shower Heads	0				0	\$0.00	\$0.00	\$0.00	
ECO5 TOTAL:	0	0	0	0	0	\$0.00	\$0.00	\$0.00	\$0.00
6 Equipment Related									
ECO6 TOTAL:	0	0	0	0	0	\$0.00	\$0.00	\$0.00	\$0.00

SYSTEMS CORP

Systems Engineering and Management Corporation, Knoxville, TN

FY94S EEAP FT. KNOX WATER CONSERVATION STUDY										10
CALCULATION WORK SHEET 1										DATE: 29 Oct 94
FACILITY NO.: 7425		FUNCTION: Maintenance								
Occupancy: 10		Operating Hours: 8								
ECO Number	ECO Type	Existing Fixture System		Retrofitted Fixture System		Usage	Fixtures	Water Leaks		
		Description	LPM	Description	LPM	HRS/YR	Quantity	Eliminated	LPY	
1	Lavatory Sinks	Public Lavatory	15	Spring Loaded Faucets	4.7	730	1			
ECO1 TOTAL:			LPM		LPM		1		0	
2	Misc. Sinks	Service Sink	30	Install Aerators	9.5	730	1			
ECO2 TOTAL:			LPM		LPM		1		0	
3	Water Closets	Floor Mounted Flush Valve	17	Install 3.5 GPF Flush Valve	13.2	18250	1			
ECO3 TOTAL:			LPM		LPM		1		0	
4	Urinals									
ECO4 TOTAL:			LPM		LPM		0		0	
5	Shower Heads									
ECO5 TOTAL:			LPM		LPM		0		0	
6	Equipment Related									
ECO6 TOTAL:							0		0	

CALCULATION WORK SHEET 2

FACILITY NO.: 7425
 Water Rate: 0.42 \$/KL Energy Rate: \$/KWH
 Gas Rate: 10.51 \$/MWH Demand Rate: \$/KW

ECO Number	Annual Water Saving LPY	Annual Energy Saving			WATER		Total	Total
ECO Type		ELEC KW	ELEC KWH	GAS MWH	Dollar Saving	Dollar Saving	Dollar Saving	Dollars Invested
1	502,605			1	\$208.58	\$221.86	\$244.80	
Lavatory Sinks	0			0	\$0.00	\$0.00	\$0.00	\$0.00
	0			0	\$0.00	\$0.00	\$0.00	\$0.00
ECO1 TOTAL:	502,605	0	0	1	\$208.58	\$221.86	\$244.80	
2	897,900			2	\$3.73	\$25.30	\$9.70	
Misc. Sinks	0			0	\$0.00	\$0.00	\$0.00	\$0.00
	0			0	\$0.00	\$0.00	\$0.00	\$0.00
ECO2 TOTAL:	897,900	0	0	2	\$3.73	\$25.30	\$9.70	
3	69,350				\$28.78	\$28.78	\$60.05	
Water Closets	0				\$0.00	\$0.00	\$0.00	\$0.00
	0				\$0.00	\$0.00	\$0.00	\$0.00
ECO3 TOTAL:	69,350				\$28.78	\$28.78	\$60.05	
4	0				\$0.00	\$0.00	\$0.00	\$0.00
Urinals	0				\$0.00	\$0.00	\$0.00	\$0.00
	0				\$0.00	\$0.00	\$0.00	\$0.00
ECO4 TOTAL:	0				\$0.00	\$0.00	\$0.00	\$0.00
5	0			0	\$0.00	\$0.00	\$0.00	\$0.00
Shower Heads	0			0	\$0.00	\$0.00	\$0.00	\$0.00
	0			0	\$0.00	\$0.00	\$0.00	\$0.00
ECO5 TOTAL:	0	0	0	0	\$0.00	\$0.00	\$0.00	\$0.00
6	0			0	\$0.00	\$0.00	\$0.00	\$0.00
Equipment Related	0			0	\$0.00	\$0.00	\$0.00	\$0.00
	0			0	\$0.00	\$0.00	\$0.00	\$0.00
	0			0	\$0.00	\$0.00	\$0.00	\$0.00
ECO6 TOTAL:	0	0	0	0	\$0.00	\$0.00	\$0.00	\$0.00

SYSTEMS CORP

Systems Engineering and Management Corporation, Knoxville, TN

FY94S EEAP FT. KNOX WATER CONSERVATION STUDY

10

CALCULATION WORK SHEET 1

DATE: 31 Oct 94

FACILITY NO.: 7738

FUNCTION:

Detention Laundry

Occupancy:

Operating Hours: 8

ECO Number ECO Type	Existing Fixture System		Retrofited Fixture System		Usage HRS/YR	Fixtures Quantity	Water Leaks Eliminated LPY
	Description	LPM	Description	LPM			
1	Lavatory Sinks						
ECO1 TOTAL:							
2	Service Sink	LPM 45	Install Aerators	LPM 9.5	365	0	0
Misc. Sinks							
ECO2 TOTAL:							
3		LPM		LPM	#FL/YR 1	0	0
Water Closets							
ECO3 TOTAL:							
4		LPM		LPM	#FL/YR 0	0	0
Urinals							
ECO4 TOTAL:							
5		LPM		LPM	HRS/YR 0	0	0
Shower Heads							
ECO5 TOTAL:							
6		LPM		LPM	0	0	0
Equipment Related							
ECO6 TOTAL:					0	0	0

SYSTEMS CORP

Systems Engineering and Management Corporation, Knoxville, TN

CALCULATION WORK SHEET 2

FACILITY NO.: 7738 Water Rate: 0.42 \$/KL Energy Rate: \$/KWH

Gas Rate: 10.51 \$/MWH Demand Rate: \$/KW

ECO Number	ECO Type	Annual Water		Annual Energy Saving			WATER		Total	
		Saving	LPY	ELEC KW	ELEC KWH	GAS MWH	Dollar Saving	Dollar Saving	Dollar Saving	Dollars Invested
1	Lavatory Sinks	0				0	\$0.00	\$0.00	\$0.00	\$0.00
		0				0	\$0.00	\$0.00	\$0.00	\$0.00
ECO1 TOTAL:		0		0	0	0	\$0.00	\$0.00	\$0.00	\$0.00
2	Misc. Sinks	777,450				2	\$3.23	\$3.41	\$3.41	\$9.70
ECO2 TOTAL:		777,450		0	0	2	\$3.23	\$3.41	\$3.41	\$9.70
3	Water Closets	0					\$0.00	\$0.00	\$0.00	\$0.00
ECO3 TOTAL:		0					\$0.00	\$0.00	\$0.00	\$0.00
4	Urinals	0					\$0.00	\$0.00	\$0.00	\$0.00
ECO4 TOTAL:		0					\$0.00	\$0.00	\$0.00	\$0.00
5	Shower Heads	0				0	\$0.00	\$0.00	\$0.00	\$0.00
ECO5 TOTAL:		0		0	0	0	\$0.00	\$0.00	\$0.00	\$0.00
6	Equipment Related									
ECO6 TOTAL:		0		0	0	0	\$0.00	\$0.00	\$0.00	\$0.00

SYSTEMS CORP

Systems Engineering and Management Corporation, Knoxville, TN

FY94S EEAP FT. KNOX WATER CONSERVATION STUDY										1012
CALCULATION WORK SHEET 1										DATE: 29 Oct94
FACILITY NO.:		7741		FUNCTION:		Dining				
Occupancy:		3 Meals / Day		Operating Hours:		8:30 am to 5:30 pm				
ECO Number	ECO Type	Existing Fixture System		Retrofited Fixture System		Usage	Fixtures	Water Leaks		
		Description	LPM	Description	LPM	HRS/YR	Quantity	Eliminated LPY		
1	Lavatory Sinks	Lavatory Faucets	9.5	Spring Loaded Faucets	4.7	730	30			
ECO1 TOTAL:			LPM		LPM		30	0		
2	Misc. Sinks									
ECO2 TOTAL:										
3	Water Closets	Floor Mounted Flush Valve	17	Install 3.5 GPF Flush Valve	13.2	10950	30	0		
				Repair Kit						
ECO3 TOTAL:			LPM		LPM		30	0		
4	Urinals	Wall Mounted Flush Valve	5.68	Install 1.0 GPF Flush Valve	3.79	10950	6			
				Repair Kit						
ECO4 TOTAL:			LPM		LPM		6	0		
5	Shower Heads									
ECO5 TOTAL:			LPM		LPM		0	0		
6	Equipment Related	3 Comp. Sink (2 faucets)	45	Install Aerators	9.5	1460	1			
		2 Comp. Sink (2 faucets)	45	Install Aerators	9.5	1460	1			
ECO6 TOTAL:							2	0		

CALCULATION WORK SHEET 2

FACILITY NO.: 7741 Water Rate: 0.42 \$/KL Energy Rate: \$/KWH
 Gas Rate: 10.51 \$/MWH Demand Rate: \$/KW

ECO Number	Annual Water Saving LPY	Annual Energy Saving			WATER		Total	Total
ECO Type		ELEC KW	ELEC KWH	GAS MWH	Dollar Saving	Dollar Saving	Dollars Invested	
1				12	\$3,258.23	\$3,385.54	\$6,120.00	
Lavatory Sinks	7,851,150			0	\$0.00	\$0.00	\$0.00	
	0			0	\$0.00	\$0.00	\$0.00	
ECO1 TOTAL:	7,851,150	0	0	12	\$3,258.23	\$3,385.54	\$6,120.00	
2				0	\$0.00	\$0.00	\$0.00	
Misc. Sinks	0			0	\$0.00	\$0.00	\$0.00	
	0			0	\$0.00	\$0.00	\$0.00	
ECO2 TOTAL:	0	0	0	0	\$0.00	\$0.00	\$0.00	
3					\$518.04	\$518.04	\$1,501.20	
Water Closets	1,248,300				\$0.00	\$0.00	\$0.00	
	0				\$0.00	\$0.00	\$0.00	
ECO3 TOTAL:	1,248,300				\$518.04	\$518.04	\$1,501.20	
4					\$51.53	\$51.53	\$318.24	
Urinals	124,173				\$0.00	\$0.00	\$0.00	
	0				\$0.00	\$0.00	\$0.00	
ECO4 TOTAL:	124,173				\$51.53	\$51.53	\$318.24	
5				0	\$0.00	\$0.00	\$0.00	
Shower Heads	0			0	\$0.00	\$0.00	\$0.00	
	0			0	\$0.00	\$0.00	\$0.00	
ECO5 TOTAL:	0	0	0	0	\$0.00	\$0.00	\$0.00	
6				5	\$12.91	\$63.33	\$8.08	
Equipment Related	3,109,800			5	\$12.91	\$63.33	\$8.08	
	0			0	\$0.00	\$0.00	\$0.00	
	0			0	\$0.00	\$0.00	\$0.00	
	0			0	\$0.00	\$0.00	\$0.00	
ECO6 TOTAL:	6,219,600	0	0	10	\$25.81	\$126.67	\$16.16	

SYSTEMS CORP

Systems Engineering and Management Corporation, Knoxville, TN

FY94S EEAP FT. KNOX WATER CONSERVATION STUDY

10

DATE: 31 Oct 94

CALCULATION WORK SHEET 1

FACILITY NO.: 7955

FUNCTION:

Occupancy:

Operating Hours:

ECO Number ECO Type	Existing Fixture System		Retrofited Fixture System		Usage HRS/YR	Fixtures Quantity	Water Leaks Eliminated LPY
	Description	LPM	Description	LPM			
1	Public Lavatory	40	Spring Loaded Faucets	4.7	130	2	
Lavatory Sinks	Public Lavatory	9.5	Spring Loaded Faucets	4.7	130	1	
ECO1 TOTAL:		LPM		LPM		3	0
2							
Misc. Sinks							
ECO2 TOTAL:		LPF		LPF	#FL/YR	0	0
3	Floor Mounted Flush Valve	17	Install 3.5 GPF Flush Valve	13.2	1300	3	
Water Closets			Repair Kit				
ECO3 TOTAL:		LPF		LPF	#FL/YR	3	0
4	Wall Mounted Flush Valve	5.68	Install 1.0 GPF Flush Valve	3.79	1300	1	
Urinals			Repair Kit				
ECO4 TOTAL:		LPM		LPM	HRS/YR	1	0
5							
Shower Heads							
ECO5 TOTAL:		LPM		LPM		0	0
6							
Equipment							
Related							
ECO6 TOTAL:						0	0

CALCULATION WORK SHEET 2

FACILITY NO.: 7955
 Water Rate: 0.42 \$/KL Energy Rate: \$/KWH
 Gas Rate: 10.51 \$/MWH Demand Rate: \$/KW

ECO Number	Annual Water Saving LPY	Annual Energy Saving			WATER	Total	Total
ECO Type		ELEC KW	ELEC KWH	GAS MWH	Dollar Saving	Dollar Saving	Dollars Invested
1 Lavatory Sinks	569,010 46,605			1 0	\$236.14 \$19.34	\$249.81 \$20.46	\$489.60 \$244.80
ECO1 TOTAL:	615,615	0	0	1	\$255.48	\$270.27	\$734.40
2 Misc. Sinks	0			0	\$0.00	\$0.00	\$0.00
ECO2 TOTAL:	0	0	0	0	\$0.00	\$0.00	\$0.00
3 Water Closets	14,820				\$6.15	\$6.15	\$180.14
ECO3 TOTAL:	14,820				\$6.15	\$6.15	\$180.14
4 Urinals	2,457				\$1.02	\$1.02	\$63.65
ECO4 TOTAL:	2,457				\$1.02	\$1.02	\$63.65
5 Shower Heads	0			0	\$0.00	\$0.00	\$0.00
ECO5 TOTAL:	0	0	0	0	\$0.00	\$0.00	\$0.00
6 Equipment Related							
ECO6 TOTAL:	0	0	0	0	\$0.00	\$0.00	\$0.00

SYSTEMS CORP

Systems Engineering and Management Corporation, Knoxville, TN

FY94S EEAP FT. KNOX WATER CONSERVATION STUDY

10

DATE: 31 Oct 94

CALCULATION WORK SHEET 1

FACILITY NO.: 7956

FUNCTION: Pool

Occupancy: 497 (max)

Operating Hours: 8

ECO Number ECO Type	Existing Fixture System		Retrofited Fixture System		Usage HRS/YR	Fixtures Quantity	Water Leaks Eliminated LPY
	Description	LPM	Description	LPM			
1	Public Lavatory	9.5	Spring Loaded Faucets	4.7	180	12	
Lavatory Sinks							
ECO1 TOTAL:		LPM		LPM		12	0
2							
Misc. Sinks							
ECO2 TOTAL:		LPF		LPF	#FL/YR	0	0
3	Floor Mounted Flush Valve	17	Install 3.5 GPF Flush Valve	13.2	2200	12	
Water Closets							
			Repair Kit				
ECO3 TOTAL:		LPF		LPF	#FL/YR	12	0
4	Wall Mounted Flush Valve	5.68	Install 1.0 GPF Flush Valve	3.79	8000	6	
Urinals							
			Repair Kit				
ECO4 TOTAL:		LPM		LPM	HRS/YR	6	0
5							
Shower Heads							
ECO5 TOTAL:		LPM		LPM		0	0
6							
Equipment Related							
ECO6 TOTAL:						0	0

SYSTEMS CORP

Systems Engineering and Management Corporation, Knoxville, TN

CALCULATION WORK SHEET 2

FACILITY NO.: 7956 Water Rate: 0.42 \$/KL Energy Rate: \$/KWH

Gas Rate: 10.51 \$/MWH Demand Rate: \$/KW

ECO Number	ECO Type	Annual Water		Annual Energy Saving			WATER		Total	
		Saving	LPY	ELEC KW	ELEC KWH	GAS MWH	Dollar Saving	Dollar Saving	Dollar Saving	Dollars Invested
1	Lavatory Sinks	774,360				2	\$321.36	\$339.96	\$2,937.60	
		0				0	\$0.00	\$0.00	\$0.00	
ECO1 TOTAL:		774,360		0	0	2	\$321.36	\$339.96	\$2,937.60	
2	Misc. Sinks					0	\$0.00	\$0.00	\$0.00	
ECO2 TOTAL:		0		0	0	0	\$0.00	\$0.00	\$0.00	
3	Water Closets	100,320					\$41.63	\$41.63	\$720.58	
ECO3 TOTAL:		100,320					\$41.63	\$41.63	\$720.58	
4	Urinals	90,720					\$37.65	\$37.65	\$381.89	
ECO4 TOTAL:		90,720					\$37.65	\$37.65	\$381.89	
5	Shower Heads	0				0	\$0.00	\$0.00	\$0.00	
ECO5 TOTAL:		0		0	0	0	\$0.00	\$0.00	\$0.00	
6	Equipment Related									
ECO6 TOTAL:		0		0	0	0	\$0.00	\$0.00	\$0.00	

SYSTEMS CORP

Systems Engineering and Management Corporation, Knoxville, TN

FY94S EEAP FT. KNOX WATER CONSERVATION STUDY										10/92
CALCULATION WORK SHEET 1										DATE: 29 Oct 94
FACILITY NO. : 7959		FUNCTION: NCO/Dining								
Occupancy: 3 Meals / Day		Operating Hours:								
ECO Number	ECO Type	Existing Fixture System		Retrofited Fixture System		Usage	Fixtures	Water Leaks		
		Description	LPM	Description	LPM	HRS/YR	Quantity	Eliminated	LPY	
1	Lavatory Sinks	Lavatory Faucets	9.5	Spring Loaded Faucets	4.7	730	6			
ECO1 TOTAL:			LPM		LPM		6	0		
2	Misc. Sinks									
ECO2 TOTAL:										
3	Water Closets	Floor Mounted Flush Valve	17	Install 3.5 GPF Flush Valve	13.2	10950	7			
				Repair Kit						
ECO3 TOTAL:			LPM		LPM		7	0		
4	Urinals	Wall Mounted Flush Valve	5.68	Install 1.0 GPF Flush Valve	3.79	10950	2			
				Repair Kit						
ECO4 TOTAL:			LPM		LPM		2	0		
5	Shower Heads									
ECO5 TOTAL:			LPM		LPM		0	0		
6	Equipment Related	3 Comp. Sink (2 faucets)	15	Install Aerators	9.5	730	1			
ECO6 TOTAL:							1	0		

SYSTEMS CORP

Systems Engineering and Management Corporation, Knoxville, TN

CALCULATION WORK SHEET 2

FACILITY NO.: 7959 Water Rate: 0.42 \$/KL Energy Rate: \$/KWH

Gas Rate: 10.51 \$/MWH Demand Rate: \$/KW

ECO Number	ECO Type	Annual Water Saving LPY	Annual Energy Saving			WATER	Total	
			ELEC KW	ELEC KWH	GAS MWH		Dollar Saving	Dollars Invested
1	Lavatory Sinks	1,570,230			2	\$651.65	\$677.11	\$1,224.00
		0			0	\$0.00	\$0.00	\$0.00
		0			0	\$0.00	\$0.00	\$0.00
ECO1 TOTAL:		1,570,230	0	0	2	\$651.65	\$677.11	\$1,224.00
2	Misc. Sinks	0			0	\$0.00	\$0.00	\$0.00
		0			0	\$0.00	\$0.00	\$0.00
		0			0	\$0.00	\$0.00	\$0.00
ECO2 TOTAL:		0	0	0	0	\$0.00	\$0.00	\$0.00
3	Water Closets	291,270				\$120.88	\$120.88	\$350.28
		0				\$0.00	\$0.00	\$0.00
		0				\$0.00	\$0.00	\$0.00
ECO3 TOTAL:		291,270				\$120.88	\$120.88	\$350.28
4	Urinals	41,391				\$17.18	\$17.18	\$106.08
		0				\$0.00	\$0.00	\$0.00
		0				\$0.00	\$0.00	\$0.00
ECO4 TOTAL:		41,391				\$17.18	\$17.18	\$106.08
5	Shower Heads	0			0	\$0.00	\$0.00	\$0.00
		0			0	\$0.00	\$0.00	\$0.00
		0			0	\$0.00	\$0.00	\$0.00
ECO5 TOTAL:		0	0	0	0	\$0.00	\$0.00	\$0.00
6	Equipment Related	240,900			0	\$1.00	\$4.91	\$8.80
		0			0	\$0.00	\$0.00	\$0.00
		0			0	\$0.00	\$0.00	\$0.00
		0			0	\$0.00	\$0.00	\$0.00
ECO6 TOTAL:		240,900	0	0	0	\$1.00	\$4.91	\$8.80

SYSTEMS CORP

Systems Engineering and Management Corporation, Knoxville, TN

FY94S EEAP FT. KNOX WATER CONSERVATION STUDY

100

CALCULATION WORK SHEET 1

DATE: 31 Oct 94

FACILITY NO.: 9261

FUNCTION:

Training Building

Occupancy:

100

Operating Hours:

ECO Number ECO Type	Existing Fixture System		Retrofited Fixture System		Usage HRS/YR	Fixtures Quantity	Water Leaks Eliminated LPY
	Description	LPM	Description	LPM			
1	Public Lavatory	9.5	Spring Loaded Faucets	4.7	130	4	
Lavatory Sinks							
ECO1 TOTAL:		LPM		LPM		4	0
2							
Misc. Sinks							
ECO2 TOTAL:		LPM		LPM		0	0
3	Floor Mounted Flush Valve	17	Install 3.5 GPF Flush Valve	13.2	4000	8	
Water Closets							
ECO3 TOTAL:		LPM		LPM		8	0
4	Wall Mounted Flush Valve	5.68	Install 1.0 GPF Flush Valve	3.79	10000	14	
Urinals							
ECO4 TOTAL:		LPM		LPM		14	0
5							
Shower Heads							
ECO5 TOTAL:		LPM		LPM		0	0
6							
Equipment Related							
ECO6 TOTAL:						0	0

SYSTEMS CORP

Systems Engineering and Management Corporation, Knoxville, TN

CALCULATION WORK SHEET 2

FACILITY NO.: 9261
 Water Rate: 0.42 \$/KL Energy Rate: \$/KWH
 Gas Rate: 10.51 \$/MWH Demand Rate: \$/KW

ECO Number	Annual Water Saving	LPY	Annual Energy Saving			WATER		Total	Total
ECO Type			ELEC KW	ELEC KWH	GAS MWH	Dollar Saving	Dollar Saving	Dollar Saving	Dollars Invested
1	186,420				0	\$77.36	\$81.84	\$979.20	
Lavatory Sinks	0				0	\$0.00	\$0.00	\$0.00	
ECO1 TOTAL:	186,420		0	0	0	\$77.36	\$81.84	\$979.20	
2	0				0	\$0.00	\$0.00	\$0.00	
Misc. Sinks									
ECO2 TOTAL:	0		0	0	0	\$0.00	\$0.00	\$0.00	
3	121,600					\$50.46	\$50.46	\$480.38	
Water Closets									
ECO3 TOTAL:	121,600					\$50.46	\$50.46	\$480.38	
4	264,600					\$109.81	\$109.81	\$891.07	
Urinals									
ECO4 TOTAL:	264,600					\$109.81	\$109.81	\$891.07	
5	0				0	\$0.00	\$0.00	\$0.00	
Shower Heads									
ECO5 TOTAL:	0		0	0	0	\$0.00	\$0.00	\$0.00	
6									
Equipment Related									
ECO6 TOTAL:	0		0	0	0	\$0.00	\$0.00	\$0.00	

SYSTEMS CORP

Systems Engineering and Management Corporation, Knoxville, TN

FY94S EEAP FT. KNOX WATER CONSERVATION STUDY

10

DATE: 31 Oct 94

CALCULATION WORK SHEET 1

FUNCTION: Training Building

9306

FACILITY NO.:

Operating Hours:

50

Occupancy:

ECO Number ECO Type	Existing Fixture System		Retrofited Fixture System		Usage HRS/YR	Fixtures Quantity	Water Leaks Eliminated LPY
	Description	LPM	Description	LPM			
1	Public Lavatory	15	Spring Loaded Faucets	4.7	130	6	
Lavatory Sinks							
ECO1 TOTAL:		LPM		LPM		6	0
2							
Misc. Sinks							
ECO2 TOTAL:		LPF		LPF	#FL/YR	0	0
3	Floor Mounted Flush Valve	17	Install 3.5 GPF Flush Valve	13.2	5000	4	
Water Closets							
			Repair Kit				
ECO3 TOTAL:		LPF		LPF	#FL/YR	4	0
4	Wall Mounted Flush Valve	5.68	Install 1.0 GPF Flush Valve	3.79	18000	4	
Urinals							
			Repair Kit				
ECO4 TOTAL:		LPM		LPM	HRS/YR	4	0
5							
Shower Heads							
ECO5 TOTAL:		LPM		LPM		0	0
6							
Equipment Related							
ECO6 TOTAL:						0	0

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CALCULATION WORK SHEET 2

FACILITY NO. : 9306 Water Rate: 0.42 \$/KL Energy Rate: \$/KWH

Gas Rate: 10.51 \$/MWH Demand Rate: \$/KW

ECO Number	ECO Type	Annual Water Saving LPY	Annual Energy Saving			WATER Dollar Saving	Total Dollar Saving	Total Dollars Invested
			ELEC KW	ELEC KWH	GAS MWH			
1	Lavatory Sinks	537,030 0			1 0	\$222.87 \$0.00	\$235.77 \$0.00	\$1,468.80 \$0.00
ECO1 TOTAL:		537,030 0	0	0	1 0	\$222.87 \$0.00	\$235.77 \$0.00	\$1,468.80 \$0.00
2	Misc. Sinks							
ECO2 TOTAL:		0 76,000	0 0	0 0	0 0	\$0.00 \$31.54	\$0.00 \$31.54	\$0.00 \$240.19
3	Water Closets							
ECO3 TOTAL:		76,000 136,080	0 0	0 0	0 0	\$31.54 \$56.47	\$31.54 \$56.47	\$240.19 \$254.59
4	Urinals							
ECO4 TOTAL:		136,080 0	0 0	0 0	0 0	\$56.47 \$0.00	\$56.47 \$0.00	\$254.59 \$0.00
5	Shower Heads							
ECO5 TOTAL:		0	0	0	0	\$0.00	\$0.00	\$0.00
6	Equipment Related							
ECO6 TOTAL:		0	0	0	0	\$0.00	\$0.00	\$0.00

SYSTEMS CORP

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FY94S EEAP FT. KNOX WATER CONSERVATION STUDY

1002

CALCULATION WORK SHEET 1

DATE: 31 Oct 94

FACILITY NO.: 9308

FUNCTION:

Training Building

Occupancy: 200

Operating Hours:

ECO Number ECO Type	Existing Fixture System		Retrofitted Fixture System		Usage HRS/YR	Fixtures Quantity	Water Leaks Eliminated LPY
	Description	LPM	Description	LPM			
1	Public Lavatory	15	Spring Loaded Faucets	4.7	130	3	
	Public Lavatory	9.5	Spring Loaded Faucets	4.7	130	11	
ECO1 TOTAL:		LPM		LPM		14	0
2							
Misc. Sinks							
ECO2 TOTAL:						0	0
3	Floor Mounted Flush Valve	17	Install 3.5 GPF Flush Valve	13.2	6000	12	
Water Closets			Repair Kit				
ECO3 TOTAL:		LPM		LPM		12	0
4	Wall Mounted Flush Valve	5.68	Install 1.0 GPF Flush Valve	3.79	24000	9	
Urinals			Repair Kit				
ECO4 TOTAL:		LPM		LPM		9	0
5							
Shower Heads							
ECO5 TOTAL:		LPM		LPM		0	0
6							
Equipment							
Related							
ECO6 TOTAL:						0	0

SYSTEMS CORP

Systems Engineering and Management Corporation, Knoxville, TN

CALCULATION WORK SHEET 2

FACILITY NO. : 9308 Water Rate: 0.42 \$/KL Energy Rate: \$/KWH

Gas Rate: 10.51 \$/MWH Demand Rate: \$/KW

ECO Number	Annual Water Saving LPY	Annual Energy Saving			WATER	Total	
ECO Type		ELEC KW	ELEC KWH	GAS MWH	Dollar Saving	Dollar Saving	Dollars Invested
1							
Lavatory Sinks	268,515			1	\$111.43	\$117.88	\$734.40
	512,655			1	\$212.75	\$225.07	\$2,692.80
ECO1 TOTAL:	781,170	0	0	2	\$324.19	\$342.95	\$3,427.20
2	0			0	\$0.00	\$0.00	\$0.00
Misc. Sinks							
ECO2 TOTAL:	0	0	0	0	\$0.00	\$0.00	\$0.00
3	273,600				\$113.54	\$113.54	\$720.58
Water Closets							
ECO3 TOTAL:	273,600				\$113.54	\$113.54	\$720.58
4	408,240				\$169.42	\$169.42	\$572.83
Urinals							
ECO4 TOTAL:	408,240				\$169.42	\$169.42	\$572.83
5	0			0	\$0.00	\$0.00	\$0.00
Shower Heads							
ECO5 TOTAL:	0	0	0	0	\$0.00	\$0.00	\$0.00
6							
Equipment Related							
ECO6 TOTAL:	0	0	0	0	\$0.00	\$0.00	\$0.00

SYSTEMS CORP

Systems Engineering and Management Corporation, Knoxville, TN

FY94S EEAP FT. KNOX WATER CONSERVATION STUDY

10

CALCULATION WORK SHEET 1

DATE: 31 Oct 94

FACILITY NO.: 9309

FUNCTION:

Training Building

Occupancy: 100

Operating Hours:

ECO Number ECO Type	Existing Fixture System		Retrofited Fixture System		Usage HRS/YR	Fixtures Quantity	Water Leaks Eliminated LPY
	Description	LPM	Description	LPM			
1	Public Lavatory	15	Spring Loaded Faucets	4.7	130	8	
	Public Lavatory	9.5	Spring Loaded Faucets	4.7	130	1	
ECO1 TOTAL:		LPM		LPM		9	0
2							
Misc. Sinks							
ECO2 TOTAL:		LPM		LPM		0	0
3	Floor Mounted Flush Valve	17	Install 3.5 GPF Flush Valve	13.2	4000	7	
Water Closets			Repair Kit				
ECO3 TOTAL:		LPM		LPM		7	0
4	Wall Mounted Flush Valve	5.68	Install 1.0 GPF Flush Valve	3.79	24000	5	
Urinals			Repair Kit				
ECO4 TOTAL:		LPM		LPM		5	0
5							
Shower Heads							
ECO5 TOTAL:		LPM		LPM		0	0
6							
Equipment							
Related							
ECO6 TOTAL:						0	0

SYSTEMS CORP

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FY94S EEAP FT. KNOX WATER CONSERVATION STUDY

2 OF 2

CALCULATION WORK SHEET 2

FACILITY NO.: 9309 Water Rate: 0.42 \$/KL Energy Rate: \$/KWH

Gas Rate: 10.51 \$/MWH Demand Rate: \$/KW

ECO Number	Annual Water Saving LPY	Annual Energy Saving			WATER	Total	Total
ECO Type		ELEC KW	ELEC KWH	GAS MWH	Dollar Saving	Dollar Saving	Dollars Invested
1	716,040			2	\$297.16	\$314.36	\$1,958.40
Lavatory Sinks	46,605			0	\$19.34	\$20.46	\$244.80
ECO1 TOTAL:	762,645	0	0	2	\$316.50	\$334.82	\$2,203.20
2	0			0	\$0.00	\$0.00	\$0.00
Misc. Sinks							
ECO2 TOTAL:	0	0	0	0	\$0.00	\$0.00	\$0.00
3	106,400				\$44.16	\$44.16	\$420.34
Water Closets							
ECO3 TOTAL:	106,400				\$44.16	\$44.16	\$420.34
4	226,800				\$94.12	\$94.12	\$318.24
Urinals							
ECO4 TOTAL:	226,800				\$94.12	\$94.12	\$318.24
5	0			0	\$0.00	\$0.00	\$0.00
Shower Heads							
ECO5 TOTAL:	0	0	0	0	\$0.00	\$0.00	\$0.00
6							
Equipment Related							
ECO6 TOTAL:	0	0	0	0	\$0.00	\$0.00	\$0.00

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